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LOSSES SUSTAINED BY GROWERS AND FARMERS
IN FLORIDA AS A RESULT OF THE CAMPAIGN
TO ERADICATE THE MEDITERRANEAN
FRUITFLY

BUREAU OF
Entomology and Plant Quarantine
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CONTROL INVESTIGATIONS

LETTER

FROM

THE SECRETARY OF AGRICULTURE

TRANSMITTING

A FULL REPORT OF THE INVESTIGATION CONDUCTED BY
THE MEDITERRANEAN FRUITFLY BOARD TOGETHER
WITH SUCH RECOMMENDATIONS AS THE SECRE-
TARY OF AGRICULTURE MIGHT IN HIS
JUDGMENT DEEM ADVISABLE IN
CONNECTION THEREWITH



MAY 10, 1939.—Referred to the Committee on Agriculture
and ordered to be printed with illustrations

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1939

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LETTER OF TRANSMITTAL

DEPARTMENT OF AGRICULTURE,
Washington, May 10, 1939.

HON. WILLIAM B. BANKHEAD,
Speaker of the House of Representatives.

DEAR MR. SPEAKER: The act of May 23, 1938 (52 Stat. 436) to provide for an investigation and report of losses resulting from the campaign for the eradication of the Mediterranean fruitfly by the Department of Agriculture provided for (1) the creation of the Mediterranean Fruitfly Board to be composed of five members to be appointed by the Secretary of Agriculture, (2) the conduct of a complete investigation and survey of all losses sustained by growers and farmers in the State of Florida, resulting from the campaign to eradicate the Mediterranean fruitfly in such State, (3) the transmittal to the Secretary of Agriculture, not later than March 15, 1939, of a full report of the investigation conducted by the Mediterranean Fruitfly Board, and (4) the transmittal by the Secretary of Agriculture of the report of the Mediterranean Fruitfly Board to the Congress, as soon thereafter as practicable, together with such recommendations as the Secretary of Agriculture might in his judgment deem advisable.

Accordingly, on July 5, 1938, the following-named persons were appointed to membership on the Mediterranean Fruitfly Board: James W. Morton (chairman), Athens, Ga.; Bernard Connor, Washington, D. C.; J. E. Crump, Winter Haven, Fla.; A. G. Porcher, Cocoa, Fla.; B. H. Thibodeaux, Washington, D. C.

The Board conducted the investigation and survey as directed, but was unable to reach a unanimous opinion as to the extent of the losses. Accordingly, there are transmitted herewith (1) the majority report signed by four members of the Board, namely: James W. Morton, chairman; J. E. Crump; A. G. Porcher; and B. H. Thibodeaux, dated March 14, 1939, (2) minority report by Bernard Connor, member of the Board, dated March 10, 1939.

In addition to the reports above described, and further in accord with the act of May 23, 1938, the following facts are submitted for consideration by the Congress.

On many occasions statements have been made to the effect that the Mediterranean fruitfly did not exist in Florida. Conclusive evidence indicates that such statements are not well founded. Qualified witnesses, including entomologists from many parts of the country associated with institutions other than the United States Department of Agriculture and the State of Florida, as well as the experts of these agencies, have testified to its presence there. Specimens actually taken from fruit produced on 1,002 properties in the State are preserved as evidence. The majority report of the Mediterranean Fruitfly Board accepts the existence of the Mediterranean fruitfly in Florida

and its subsequent eradication as a fact. Regarding its presence there they state:

The Mediterranean fruitfly was discovered in Orange County, Fla., in the vicinity of Orlando, on April 6, 1929. Altogether a total of 1,002 properties were found to be infested from the time the presence of the fly was discovered in Florida until July 25, 1930, when the last infestation was found.

The majority report points out the thoroughness with which the Board conducted its investigation. The lapse of time, however, between the eradication campaign and the investigation made it impossible to do more than estimate in a general way the losses sustained by growers and farmers. This is reflected in the various amounts reported as representing the losses by the majority, the minority, and replies to questionnaires by farmers and growers themselves. There is such a wide variance in the figures as shown in the following table that it appears impossible to harmonize them or to determine with reasonable certainty the losses actually sustained.

	Growers and farmers	Report of 4 members	Opinion by 1 member
Destruction of crops:			
Citrus fruits.....		\$406, 400	\$374, 000
Noncitrus fruits.....		31, 300	27, 925
Vegetable and field crops.....		318, 000	125, 000
Picking and burying drops and splits.....		1, 062, 300	295, 396
Cost of spraying.....		54, 900	31, 830
Spray damage to citrus trees.....		1, 660, 300	0
Additional pruning costs.....		148, 900	0
Sterilization of fruits.....		0	0
Price losses on citrus:			
Oranges and tangerines.....		2, 538, 000	0
Grapefruit.....		614, 000	0
Livestock losses.....		0	0
Other losses (miscellaneous).....		350, 000	0
Total.....	\$12, 147, 471. 55	7, 184, 100	854, 151

The specified items of loss sustained by growers and farmers in Florida fall in three classes: (1) Destruction of citrus and other fruits or vegetables and of field crops estimated at \$755,700 in the majority report and at \$526,925 in the minority report; (2) costs of damage from special operations (poison-bait spray, special pruning, picking and burying citrus drops) and "miscellaneous" estimated at \$3,276,400 in the majority report and at \$327,226 in the minority report; and (3) price losses on citrus estimated at \$3,152,000 in the majority report and at nothing in the minority report.

In the enforcement of both plant and animal quarantines the policy of the Federal Government has been, consistently, not to indemnify for losses in the second and third classes as will be seen in the following review of programs which have been prosecuted by the Federal Government with respect to certain other more or less similar quarantine and eradication projects.

BOVINE TUBERCULOSIS

Federal participation in this program started in October 1918, and still is in progress. The following figures are from October 1918 to July 1, 1938.

Number of cattle slaughtered.....	3, 562, 161
Indemnities paid by Federal Government.....	\$85, 000, 000
Indemnities paid by States.....	128, 000, 000
Salvage value of animals.....	74, 677, 193

Rates for compensating owners of cattle have varied. At present the Federal Government pays an indemnity not to exceed one-third of the difference between the appraised value of each animal and its salvage value. In no case does the payment exceed \$25 for any grade animal, or \$50 for any purebred animal. Beginning May 1, 1939, the States must pay at least as much as the Federal Government.

BANG'S DISEASE

Federal participation in this eradication program started July 1, 1934, and is still under way. The following figures are from July 1, 1934, to July 1, 1938.

Number of cattle slaughtered.....	1, 760, 161
Indemnities paid by Federal Government.....	\$40, 000, 000
Indemnities paid by States.....	1, 500, 000
Salvage value of animals.....	¹ 30

¹ A head (estimate).

This program was begun during the emergency drought period when States were not required to match Federal funds. Beginning May 1, 1939, rates of Federal payments are the same as for bovine tuberculosis and the States must match Federal funds.

Indemnities paid for livestock destroyed in outbreaks of foot-and-mouth disease

Outbreak	Number of animals	Total appraisals	Indemnities paid			
			Federal Government		States	
			Percent	Amount	Percent	Amount
1902.....	4, 401	\$184, 155. 11	70	\$128, 908. 57	30	\$55, 246. 54
1908.....	3, 636	90, 033. 18	66½	60, 022. 12	33½	30, 011. 06
1914-15.....	172, 222	5, 865, 720. 00	50	2, 932, 860. 00	50	2, 932, 860. 00
1924-25.....						
California.....	109, 766	4, 286, 291. 25	50	2, 143, 145. 63	50	2, 143, 145. 62
Texas.....	31, 918	979, 298. 28	50	489, 649. 14	50	489, 649. 14
1929.....	3, 591	107, 539. 00	50	53, 769. 50	50	53, 769. 50
1932.....	18, 817	203, 328. 60	50	101, 664. 30	50	101, 664. 30
Total.....	344, 351	11, 716, 354. 42	-----	5, 910, 019. 26	-----	5, 806, 346. 16

Under this program farmers have been compensated for the full meat or dairy value of the animal. Not more than three times the meat or dairy value was allowed for breeding animals, regardless of appraisal value placed on the animal. In cases of emergency, the Federal Government has paid the full amount to farmers, but was later reimbursed by the States for their share of the indemnity.

GYPSY MOTH

In the New England area, nurserymen and concerns which handle products likely to carry the eggs of the gypsy moth perform special spray operations, use special methods of handling shavings and perform numerous operations in addition to normal practices in order that nursery stock, lumber, quarry products, and many other articles may be certified as free from infestation of this pest and thus move freely throughout the United States. In this case no reimbursement or compensation has been paid by the Federal Government.

JAPANESE BEETLE

The Japanese beetle attacks a wide variety of plants and can be moved by artificial means by many articles, including nursery stock, farm products, sand, soil, compost, and manure. In order that products which may carry it be certified for movement outside the regulated area, many kinds of treatment are required. Arsenate of lead at the rate of 1,500 pounds per acre must be worked into the soil around the roots of certain nursery stock, at least 6 months before it is certified for movement. Other types of nursery stock may have to be fumigated or the ball of soil given other treatment.

Blueberries and considerable variety of farm products have to be fumigated or given special treatment before they can be moved outside the regulated area. When the Japanese beetle was first discovered in New Jersey these methods of treatment were unknown and for a considerable period the movement of the products to points outside the regulated area was prohibited.

Then, and still to a certain extent, the market of the producers was restricted, normal trade movement was affected and products sold at such prices as prevailed locally. Price differentials during many seasons caused material losses to producers. The individuals, local committees, and States accepted such losses and, in addition, performed many operations involving expenditure above customary practices to control the beetle.

MEXICAN FRUITFLY

In 1927 a limited infestation of the Mexican fruitfly was found in the citrus cultures of the lower Rio Grande Valley of Texas. Since that time the Department, the State of Texas, and the affected communities of Texas have cooperated in the suppression of this pest. During this period the farmers and growers have been required to meet regulations very similar to those used in connection with the eradication of the Mediterranean fruitfly from Florida. The farmers and growers have picked up and buried hundreds of tons of dropped and culled fruit. They have carried out other sanitary practices in the orchards and packing houses. They have destroyed without specific requirement more than 40,000 plants which produced fruit that may be attacked by the Mexican fruitfly during a period when citrus is not in a stage of development to be attacked by the fly. This has restricted the kinds of fruit produced in the area to citrus. During recent years they have treated a considerable portion of the citrus crop by methods almost identical with those used in Florida. These activities in the lower Rio Grande Valley have been performed under State authority and under supervision in basically the same manner as was comparable work in Florida. The farmers in the lower Rio Grande Valley of Texas have not received special compensation for extra work or possible losses that may have occurred in connection with the work to suppress the Mexican fruitfly.

CITRUS CANKER

In 1914 citrus canker, a very infectious bacterial disease of citrus, native to the Orient, was discovered in Florida. Its presence threatened the profitable production of citrus in Florida and elsewhere in the United States. To protect these interests, the Department, in

cooperation with responsible State agencies, began a program to eradicate the disease in 1915. The only way this disease can be combated is to locate the infested trees and destroy them. The effort to eradicate the disease from the United States has been very successful. During recent years it has been found in only a very few noncommercial areas. It has been eliminated from all areas where citrus is produced commercially.

In carrying out the work in that State the citizens surrendered more than 500,000 trees which had become infected with the disease. Their properties were repeatedly inspected and were subjected to many operations which interfered with the normal activities of the individual and community. The farmers and growers of Florida have never been compensated for the trees they lost.

CORN BORER

In 1927, at the peak of the corn-borer infestation, the Congress appropriated \$9,811,750 for control work. Of this amount, \$4,662,249 was paid directly to the growers. None of the crop was destroyed, nor was the payment in the nature of an indemnity. Farmers were paid at rates ranging from 50 cents to \$2 an acre to cut stalks from infested fields, rake and burn them. In infested fields where the farmer did not do the work, the fields were raked and burned under Government supervision and the farmers were assessed \$4 an acre for this service.

PINK BOLLWORM

This pest, crossing over the border from Mexico in 1917, has been held in check in a few of the border and near-border counties in Texas, New Mexico, and Arizona. In 1931, in a section of Arizona, where infestation was heavy, cropland was kept out of cotton for 1 year. Farmers were compensated for the difference between cash crops grown in the place of cotton and the estimated return if the land had been planted to cotton. A total of \$635,982 was paid to the farmers by the Federal Government. Later, the State of Arizona repaid \$310,839 for its half the program plus interest. As some Indian lands were included, the Federal grants amounted to a little more than half the total amount.

DATE SCALE

From 1926 to 1934, scale attacked California date trees. Where infestation was worst, trees were destroyed. Mildly infested orchards were defoliated and burned with blow torches, thus setting back fruit crops from 1 to 3 years. Farmers did not receive indemnity for loss of trees or loss of crops.

PHONY PEACH DISEASE AND PEACH MOSAIC

The Bureau of Entomology and Plant Quarantine has been waging a fight against peach mosaic and phony peach disease in the southern and western States for many years. In the past 3 years a total of 269,237 trees with mosaic and 93,579 trees with phony peach disease have been destroyed. In neither instance have farmers been compensated for loss of crops or loss of trees.

In the enforcement of plant quarantines and eradication campaigns under the Plant Quarantine Act of 1912, it has been the established policy not to indemnify owners for plants, plant products, or other property injured or destroyed to prevent the spread of pests.

Most of the acts appropriating funds for eradication of plant pests carry the proviso that no part of the appropriation shall be used for payment of claims of this nature. In the enforcement of quarantines against animal diseases, it has been the policy to make reimbursement for condemned infected animals or those exposed to infection only under the following conditions: Express provision for reimbursement in the appropriation act; appraisal of the animals at the time of destruction, with a stated maximum limit of value; Federal liability limited to one-third or one-half the indemnity.

The Federal Government does not pay claims in such instances for the expense incident to disposal of dead animals, disinfection of premises, special treatment of remaining livestock, losses resulting from quarantine restrictions, and other similar items.

When the Mediterranean fruitfly program was being considered, and during its prosecution the question of reimbursement for damages was considered. The report of the Chief of the Plant Quarantine and Control Administration, dated August 31, 1929, discusses remuneration for fruit destroyed. After giving the quantities of citrus fruit, vegetables, and noncitrus fruits destroyed prior to August 1, 1929, it is stated:

Not all of these host fruits and vegetables were actually infested, but were included in the order because produced in or within 1 mile of the infested properties * * *. A large portion of the citrus fruit destroyed represents culls and drops which would have had no market value. A considerable number of owners, however, who had not marketed their fruit, lost their entire crop. No reimbursement has been requested for such destruction of fruit of the crop of 1928-29, and no reimbursement for such fruit is now contemplated.

Plans for the summer and fall of 1929 included the proposed removal and destruction of all citrus and other host fruits within the infested area. A bill was introduced in Congress in December 1929, which carried an item of \$10,000,000 for reimbursement from the National Treasury to the growers of such fruit. This reimbursement idea had in fact already been endorsed in principle by the Secretary of Agriculture and had received the approval of the Bureau of the Budget in the customary language that the expenditures contemplated "would not be in conflict with the financial program of the President." While this was pending, methods of sterilization were worked out that would permit the safe marketing of practically all of the fruit from previously infested zones, and the plan for extensive destruction of fruit of the 1929-30 crop was abandoned. The appropriation as finally made did not make any provision for reimbursement of growers.

The eradication program was conducted by the Department of Agriculture in cooperation with the State of Florida, and each of the three Federal acts appropriating funds for this purpose carried the proviso that "In the discretion of the Secretary of Agriculture no expenditure shall be made hereunder until a sum or sums adequate to State cooperation shall have been appropriated, subscribed, or contributed by State, or local authorities, or individuals or organizations."

The Federal expenditure of \$6,764,364.47 in the eradication campaign was about 90 percent (95 percent if only Florida public funds are considered) of the total cost. The State of Florida expended the sum

of \$385,032.21, and the counties, municipalities, civic organizations, and the like contributed amounts and services aggregating \$363,740.11.

The report of the Secretary of Agriculture to the President, November 15, 1929, makes the following statement of policy with reference to Mediterranean fruitfly eradication:

The estimate of necessary Federal expenditures does not include those phases of the work that may possibly be done by the citizens of Florida, such as the eradication of minor hosts, the spraying and clean-up work in commercial and private orchards. The costs incident to those phases of eradication which relate to production and handling and marketing of commercial crops are to be borne by the growers and shippers. Certain phases of the work, however, cannot be thus delegated. Accordingly, the estimate provides that the Federal Government, in cooperation with the State, shall be responsible for (1) supervision of the spraying and clean-up done by the owners, (2) the clean-up of wild and noncommercial lands, abandoned properties, etc., (3) the spraying of roadsides, town properties, and wild land, (4) the scouting necessary throughout Florida and other States, (5) the certification of products, (6) the supervision of sterilization, and (7) the enforcement of quarantine regulations.

The apparent intent of that report was that costs incident to production and handling of market crops were not to be borne by the Federal Government.

The orchard work required under the eradication campaign, while costly, was necessary for the protection of the individual crops against threatened fruitfly damage. The use of poison bait spray, the elimination of summer host fruits, and the picking up and disposing of fallen citrus fruits are measures that a careful and prudent grower would adopt in the circumstances. The necessity for eradication did require in the Florida emergency an unusually rigid and thoroughgoing use of these measures by everyone in the invaded and threatened areas.

The eradication of the Mediterranean fruitfly involves a threefold benefit to the Nation, to the State, and to the individual producers whose properties were or might have been affected.

Since the Federal Government has exclusive jurisdiction of foreign commerce under the Constitution, the responsibility for the original infestation, theoretically, is Federal. The direct conduct of the eradication program, however, was an exercise of the constitutional police power of the State of Florida. The individual farmers themselves cooperated and in most cases advocated the eradication program to preserve the value of their properties and the existence of their industry. It seems readily apparent that the responsibility for any activities incident to the program as well as the benefits resulting therefrom must be shared by the Nation, the State, and the farmers themselves.

The facts available to this Department briefly outlined above indicate three general conclusions: First, Congress did not contemplate or intend that damages to producers resulting from the eradication of the Mediterranean fruitfly be assumed by the Federal Government; second, no precedent for payment of such damages by the Federal Government in similar circumstances exists; third, no unusual legal or equitable considerations which might distinguish the Mediterranean fruitfly eradication from other plant eradication, control, or quarantine programs appear to exist. Nevertheless, this Department does not presume to recommend to the Congress what policy should be followed with respect to any proposal for reimbursement. If a new policy is to be established it is wholly a matter of legislative jurisdiction. If, however, the Congress should determine to reimburse

growers and others who suffered losses directly or indirectly in connection with the eradication of the Mediterranean fruitfly, this Department would, on the basis of administrative experience, recommend that a procedure be established to determine specifically the actual loss of each claimant before any payment is made. This recommendation is based on the difficulty experienced by the Board in estimating damages. On the same basis of administrative experience, we also recommend that financial participation of the Federal Government in any proposed reimbursement not exceed one-half of the losses which may be established. In computing the Federal Government's share of such damages, the cash contributions of the Federal Government in the eradication program itself together with cash contributions of any other governmental unit should be calculated as part of the total sum on which reimbursement is based.

A somewhat analogous policy of the Federal Government which should be considered in this connection is the Federal crop insurance program now applicable to wheat. In passing the Federal Crop Insurance Act, the Congress adopted a policy of alleviating the burdens placed upon individual producers by unforeseen natural hazards similar to the Mediterranean fruitfly infestation. Under this program such losses are not assumed as the responsibility of the Federal Government. The facilities of Government are made available to farmers in such a way as to spread the risk among all members of a given agricultural production group. Such a program operates to spread the loss resulting from natural hazards among a large group of growers and over a long period of years. In this connection it should be pointed out that based on shipments of citrus fruits the California Fruit Growers Exchange has estimated that the percentage of the entire citrus fruit crop damaged by reason of frost has ranged in various years from 1908 to 1922 between 5 percent and 75 percent of the entire crop. The annual farm value of Florida production of all host crops of the Mediterranean fruitfly is estimated at \$60,000,000 for 1928. The estimate of the majority of the Mediterranean Fruitfly Board of loss from production of these products is \$755,700, which is about 1.26 percent of this annual farm value, and the minority estimate of \$526,925 is about 0.88 percent. The entire loss as estimated by the majority of the Board at \$7,184,100 is 11.97 percent of the annual farm value. The entire loss as estimated in the minority report at \$854,151 is 1.42 percent.

The burden of an emergency loss of such amounts would not be serious on a percentage basis if distributed over the crop industries directly benefited by the successful outcome of the eradication campaign. Such losses, however, can and do assume tremendous proportions when viewed as a financial responsibility of the Government.

The Department of Agriculture has studied the possibilities of insuring fruit crops insofar as available facilities and funds would permit. While there seems to be an encouraging outlook in this direction, any program under which the Federal Government would consider assuming outright the financial responsibility for insects, diseases, unusual weather conditions, or other hazards to agricultural production should have exceedingly careful consideration from the standpoint of sound public policy and economic feasibility.

Respectfully submitted.

H. A. WALLACE,
Secretary.

MAJORITY REPORT

LETTER OF SUBMITTAL

DEPARTMENT OF AGRICULTURE,
MEDITERRANEAN FRUITFLY BOARD,
Washington, D. C., March 14, 1939.

HON. HENRY A. WALLACE,
Secretary of Agriculture, Washington, D. C.

DEAR MR. SECRETARY: The Mediterranean Fruitfly Board submits herewith its report on losses sustained by growers and farmers in Florida as a result of the campaign to eradicate the Mediterranean fruitfly from that State in 1929 and 1930.

The Board was appointed on July 5, 1938, by Mr. Harry L. Brown, Acting Secretary of Agriculture, pursuant to authority conferred in the act entitled "To provide for an investigation and report of losses resulting from the campaign for the eradication of the Mediterranean fruitfly by the Department of Agriculture," approved May 23, 1938.

The report consists of a summary description of the eradication campaign, and an evaluation of consequent losses reported by farmers and growers. The Board has endeavored in the report to substantiate its position in respect to negative as well as positive findings of loss. An appendix contains a copy of the act authorizing the appointment of the Board and the preparation of its report, and gives statistical and other information used in the making of estimates.

This report is subscribed to by all members of the Board except Mr. Bernard Connor.

Respectfully,

JAMES W. MORTON,
Chairman, Athens, Ga.
J. E. CRUMP,
Winter Haven, Fla.
A. G. PORCHER,
Cocoa, Fla.
B. H. THIBODEAUX,
Washington, D. C.

ACKNOWLEDGMENTS

The preparation of this report was made possible primarily by the assistance and cooperation of farmers, growers, and packing-house groups in Florida, and of workers connected with the United States Department of Agriculture, the Florida State Plant Board, the Florida Agricultural Experiment Station, and the Florida Agricultural Extension Service.

Staff members of the State Plant Board and the University of Florida not only made their files of unpublished material available, but acted also in a consultative capacity in furnishing information on various phases of the eradication campaign. Citrus research workers and others of the Florida Agricultural Experiment Station gave freely of their time in furnishing information. County agricultural agents were instrumental in assisting with a widespread questionnaire survey of losses sustained by producers.

The Board is indebted to farmers and growers in Florida for their cooperation in supplying information. Appreciation is expressed also to packing-house groups and operators, particularly the Florida Citrus Exchange, American Fruit Growers, Chase & Co., and Gentile Bros., for their cooperation in furnishing data on citrus shipments and prices.

Much use was made of sources of information in the United States Department of Agriculture. The destruction and other records pertaining to the eradication campaign that are filed in the Bureau of Entomology and Plant Quarantine constituted an important basis for the making of certain estimates. The Board is indebted to the Bureau of Agricultural Economics for clerical, stenographic and other assistance. Messrs. W. H. Youngman and H. W. Hawthorne of that Bureau assisted at every stage in the actual preparation of this report.

While appreciative of the assistance of those who aided in its work, the Board assumes sole responsibility for the views expressed in this report.

SUMMARY OF ESTIMATED LOSSES

The Mediterranean Fruitfly Board estimates that the losses sustained by growers and farmers in Florida resulting from the campaign to eradicate the Mediterranean fruitfly in that State in 1929 and 1930 amounted to a total of \$7,184,100. The items comprised within this estimated total loss are as follows:

Destruction of crops:		
Citrus fruits.....	\$406, 400	
Noncitrus fruits.....	31, 300	
Vegetable and field crops.....	318, 000	
		<hr/> \$755, 700
Spray damage to citrus trees.....		1, 660, 300
Additional pruning costs.....		148, 900
Cost of spraying.....		54, 900
Picking and burying citrus drops and splits.....		1, 062, 300
Sterilization of fruit.....		0
Price losses on citrus:		
Oranges and tangerines.....	\$2, 538, 000	
Grapefruit.....	614, 000	
		<hr/> 3, 152, 000
Livestock losses.....		0
Other losses (miscellaneous).....		350, 000
		<hr/>
Total.....		7, 184, 100

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LOSSES SUSTAINED BY GROWERS AND FARMERS IN FLORIDA AS A RESULT OF THE CAMPAIGN TO ERADICATE THE MEDITERRANEAN FRUITFLY

INTRODUCTION

AUTHORIZATION FOR REPORT AND MEMBERSHIP OF BOARD

The Mediterranean Fruitfly Board, composed of five members, was appointed by the Secretary of Agriculture on July 5, 1938, in accordance with an Act of Congress (Public, No. 535, 75th Cong., S. 842) entitled "To provide for an investigation and report of losses resulting from the campaign for the eradication of the Mediterranean fruitfly by the Department of Agriculture." A copy of the act is shown as appendix 1 of this report.

The functions of the Board and the authorization for the preparation of this report are stated in section 2 of the act, which reads as follows:

The Board is authorized and directed to conduct a complete investigation and survey of all losses sustained by growers and farmers in the State of Florida resulting from the campaign to eradicate the Mediterranean fruit fly in such State and transmit to the Secretary of Agriculture not later than March 15, 1939, a full report of the results of such investigation and survey: *Provided*, That such report shall serve as information only and shall not be construed as imposing any legal or moral obligation upon the Government of the United States. The Secretary of Agriculture shall, as soon thereafter as practicable, transmit such report of survey to Congress, together with such recommendations as he may, in his judgment, deem advisable.

It is further stipulated in the act that the Board shall cease to exist upon transmitting its report.

The five members of the Board are James W. Morton, chairman, a farmer from Athens, Ga.; J. E. Crump of Winter Haven, Fla., and A. G. Porcher of Cocoa, Fla., citrus producers; B. Connor, assistant business manager of the Bureau of Entomology and Plant Quarantine; and B. H. Thibodeaux, senior agricultural economist in the Bureau of Agricultural Economics, United States Department of Agriculture.

METHOD OF WORK

The Board spent a large part of the summer of 1938 in Florida in obtaining information from producers, agricultural experiment station and extension workers, packing house operators, and others as to the losses sustained by producers resulting from the campaign to eradicate the Mediterranean fruitfly. This work in Florida was supplemented with an investigation of available sources of information in the United States Department of Agriculture and elsewhere. The sources of material used by the Board in formulating its loss estimates included the following: (1) A widespread questionnaire survey among producers; (2) personal interviews with producers; (3) experimental data, published and unpublished; (4) observations of agricultural workers and of officials in charge of the eradication activities; (5) data on citrus prices and shipments from packing-

house records; (6) official records of the eradication campaign (destruction records, infestation maps, regulations and instructions, inspectors' and supervisors' reports, etc.), published and unpublished, available from the United States Department of Agriculture and the Florida State Plant Board; (7) production, carlot shipment, price, cost, and other data from the United States Department of Agriculture, the Florida Agricultural Experiment Station, the Florida State Department of Agriculture, and other sources; (8) evidence presented at congressional hearings conducted at Orlando, Fla., in 1930 by a special subcommittee of the House Committee on Appropriations.

The task of the Board consisted, first, of determining the kinds of losses sustained by producers and, second, of evaluating those losses found to be justified in terms of prices that prevailed at the time of the eradication campaign, or of prices that would have prevailed had it not been for the influence of the eradication campaign. The decisions of the Board in respect to the loss estimates contained in this report were based upon a careful evaluation of the information available. Reports as to kinds of losses sustained were examined in the light of experimental data and observations whenever possible. Thus, certain types of loss claims were found to be disproved by experimental evidence, while others were justified in the opinion of the Board. But in formulating its estimates, and in their presentation here, the Board has endeavored to substantiate its position in respect both to kinds of losses considered justified and to those considered inadmissible.

A direct valuation procedure was possible for certain types of losses, such as total quantities of crops destroyed. There the problem consisted of determining the quantities of crops destroyed that were marketable, and of applying to these quantities the prices that prevailed at the time of destruction. For certain other losses it was necessary to make decisions as to the average loss per acre or per tree, and to apply this average loss to the total number of acres or trees affected by the eradication campaign in order to arrive at estimates of loss for such items. In other cases involving relatively minor items, no quantitative basis existed for the formulating of estimates and the Board found it necessary to make decisions based largely on considered judgment and on the observations of experienced agricultural workers in the State. The method of procedure used for each class of loss items is explained in connection with the discussion pertaining to that item.

The Board wishes at the outset emphatically to qualify the possible use by others of its estimates in respect to average losses per acre, per tree, or per unit of production. These unit estimates are averages, and as such do not indicate the variations in losses sustained by individuals, which may range from nothing to amounts substantially above the unit averages contained in this report. It is important that this be kept in mind should any plan be developed for the consideration of individual producer losses.

SUMMARY DESCRIPTION OF THE ERADICATION CAMPAIGN

The Mediterranean fruitfly was discovered in Orange County, Fla., in the vicinity of Orlando, on April 6, 1929. Altogether, a total of 1,002 properties were found to be infested from the time the pres-

ence of the fly was discovered in Florida until July 25, 1930, when the last infestation was found (table 1). Most of the infestations were found during the first few months following the discovery of the fly. Only 11 new infestations were determined after August 1, 1929, as indicated in the footnote to table 1.

TABLE 1.—*Number of properties found and reported infested with the Mediterranean fruitfly in Florida during the eradication campaign, by counties and by months, 1929-30*¹

County	1929							1930				Total
	Apr. 6 to June 30	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.- Feb.	Mar.	Apr.- June	July	
Alachua.....	0	1	0	0	0	0	0	0	0	0	0	1
Brevard.....	72	0	0	0	0	0	0	0	0	0	0	72
Citrus.....	0	0	1	0	0	0	0	0	0	0	0	1
Duval.....	0	1	0	0	0	0	0	0	0	0	0	1
Flagler.....	4	1	1	0	0	0	0	0	0	0	0	6
Hernando.....	0	4	0	0	0	0	0	0	0	0	0	4
Hillsborough.....	17	13	1	0	0	0	0	0	0	0	0	31
Lake.....	88	7	1	0	0	0	0	0	0	0	0	96
Levy.....	1	6	0	0	0	0	0	0	0	0	0	7
Marion.....	7	4	1	0	0	0	0	0	0	0	0	12
Orange.....	400	0	0	0	0	1	0	0	1	0	0	402
Osceola.....	27	2	0	0	0	0	0	0	0	0	0	29
Pasco.....	0	6	3	0	0	0	0	0	0	0	0	9
Pinellas.....	9	7	0	0	0	0	0	0	0	0	0	16
Polk.....	34	1	2	0	0	0	0	0	0	0	0	37
Putnam.....	18	4	2	0	0	0	0	0	0	0	0	24
St. Johns.....	8	1	1	0	0	0	0	0	0	0	1	11
Seminole.....	97	0	0	0	0	0	0	0	0	0	0	97
Sumter.....	1	0	0	0	0	0	0	0	0	0	0	1
Volusia.....	144	1	0	0	0	0	0	0	0	0	0	145
Total.....	927	59	13	0	0	1	0	0	1	0	1	1,002

¹ Properties listed as of date of technical determination of infestation of material rather than date of collection. 5 of properties reported under August 1929 relate to collections made on July 30 and 31 of that year.

Source: Service and Regulatory Announcements (S.R.A.—P.Q.C.A., No. 101, p. 183) of the Plant Quarantine and Control Administration, U. S. Department of Agriculture, and Eighth Biennial Report of the State Plant Board of Florida. pp. 58 and 59.

The infestations found were widespread over the north-central part of Florida, as indicated in figure 1. The last two infestations determined are not indicated on the map. The area delineated with heavy black lines, referred to later as the "eradication area," contained approximately 80 percent of all the orange, grapefruit, and tangerine trees in Florida in 1929. The 22 counties contained wholly or in part within the eradication area furnished approximately 80 percent of the total citrus carlot shipments and 53 percent of the truck-crop carlot shipments from Florida during the 6 years 1926-32, excluding 1929. The 22 counties entirely or in part within the eradication area were Alachua, Bradford, Brevard, Citrus, Clay, Duval, Flagler, Hernando, Hillsborough, Lake, Levy, Marion, Orange, Osceola, Pasco, Pinellas, Polk, Putnam, St. Johns, Seminole, Sumter, and Volusia.

Based on the experience in other countries, the presence of the Mediterranean fruitfly was viewed as a threat to the very existence of the commercial citrus industry and of commercially important non-citrus fruits, vegetables, and other crops in Florida and in other States with comparable growing conditions. In view of this situation, stringent measures were taken by the United States Department of

Agriculture and the Florida State Plant Board, acting cooperatively, to eradicate the insect. It was decided early that complete eradication was feasible and preferable to measures designed merely to control the spread or damage of the insect.

The eradication campaign comprised two phases that were carried on simultaneously: First, measures to exterminate the fly, and, second, measures to prevent its spread. A detailed account of the eradication campaign is available in the Service and Regulatory Announcements of the Plant Quarantine Control Administration, United States Department of Agriculture, for 1929 and 1930; in the monthly reports of the Florida State Plant Board for the same period; and in the Eighth Biennial Report of the Florida State Plant Board. Consequently, only a brief description is given here of those major phases of the campaign that are pertinent to a consideration of losses sustained by producers in Florida.

(1) Extermination measures comprised the elimination of host fruits and vegetables known or believed to provide food for the fly, and the substitution therefor of a sweetened poison spray to destroy the insect. These measures were applied with different degrees of intensity in the various "zones" into which the State was subdivided by United States quarantine No. 68, effective May 1, 1929, and by regulations of the Florida State Plant Board. "Infested zones" (commonly known as zones 1 and hereinafter so referred to) included all of the area within 1 mile of the outside boundary of any property on which infestation was determined. "Protective zones" (commonly known as zones 2 and hereinafter so referred to) included all of the area within 9 miles of the outside boundaries of any zone 1. A barrier area (commonly known as zone 3) was established on May 13, 1929, by rule 43A of the Florida State Plant Board, and consisted of all that portion of Florida lying east and south of the Ocklockonee River and lying outside of zones 1 and 2.

Effective September 1, 1929, an eradication area was established to include zones 1 and 2 and a small part of zone 3. The northern and southern boundaries of the eradication area are shown by the heavy black lines in figure 1, as already indicated, and encompassed all or parts of 22 counties in the north-central portion of Florida.

Zones 1 were retained as such until October 14, 1929, when they were released from an "infested zone" status and became part of the eradication area, except for nine properties, each with its 1-mile radius, that were found to be infested between July 31 and August 21, 1929. These nine infested areas were retained as zones 1 until December 2, 1929, when they also became part of the eradication area and subject to the uniform regulations that applied to that area. Three later infestations were determined on November 16, 1929, and on March 4 and July 25, 1930. These were thoroughly cleaned up and no further infestations were discovered.

The number of citrus acres and trees in the different zones comprised within the eradication area are shown in table 2. Zone 3 in the table refers to that part of the citrus acreage and trees outside of zones 1 and 2 that was included within the eradication area established on September 1, 1929.¹

¹ Data on the acreage and number of citrus trees in the eradication area are given by counties in appendix 2, together with an explanation of the method of allocation used.

TABLE 2.—*Citrus acreage and trees in the eradication area in Florida, by zones, kinds of citrus, and ages of trees, 1929*^{1 2}

Item	Zone 1 ³		Zone 2 ³		Zone 3 ³		Eradication area	
	Trees	Acres ⁴	Trees	Acres ⁴	Trees	Acres ⁴	Trees	Acres ⁴
Oranges: ⁵								
5 years and less.....	1,394,000	20,880	1,736,900	28,025	81,600	1,305	3,212,500	50,210
6 to 10 years.....	1,129,100	17,000	1,797,900	29,255	52,300	825	2,979,300	47,080
11 to 15 years.....	615,100	9,195	913,400	14,830	31,400	490	1,559,900	24,515
16 years+.....	1,136,000	16,695	1,172,500	18,425	70,500	1,080	2,379,000	36,200
Total.....	4,274,200	63,770	5,620,700	90,535	235,800	3,700	10,130,700	158,005
Tangerines: ⁵								
5 years and less.....	279,300	4,200	300,400	4,845	15,500	260	595,200	9,305
6 to 10 years.....	193,600	2,955	274,500	4,455	9,300	140	477,400	7,550
11 to 15 years.....	57,600	860	82,600	1,345	2,300	30	142,500	2,235
16 years+.....	82,600	1,200	81,400	1,260	3,900	60	167,900	2,520
Total.....	613,100	9,215	738,900	11,905	31,000	490	1,383,000	21,610
Grapefruit: ⁵								
5 years and less.....	298,900	4,545	558,300	9,185	11,500	195	868,700	13,925
6 to 10 years.....	294,400	4,575	711,100	11,730	11,600	185	1,017,100	16,490
11 to 15 years.....	272,400	4,185	622,200	10,200	11,900	195	906,500	14,600
16 years+.....	271,600	4,105	424,200	6,850	9,800	150	703,600	11,105
Total.....	1,137,300	17,410	2,315,800	37,985	44,800	725	3,497,900	56,120
All citrus: ⁵								
5 years and less.....	1,972,200	29,625	2,595,600	42,065	108,600	1,760	4,676,400	73,440
6 to 10 years.....	1,617,100	24,530	2,793,500	45,440	73,200	1,190	4,373,800	71,120
11 to 15 years.....	945,100	14,240	1,618,200	26,395	43,600	715	2,608,900	41,350
16 years+.....	1,490,200	22,000	1,678,100	26,585	84,200	1,290	3,252,500	49,825
Total.....	6,024,600	90,395	8,675,400	140,425	311,600	4,915	15,011,600	235,735

¹ The eradication area includes all or parts of 22 counties in the north-central part of Florida delineated with heavy black lines in figure 1.² Estimates include 1929 plantings.³ Distribution of trees in between zones based upon unpublished data as of July 31, 1929, prepared by the late J. E. Turlington, who was statistician for the Mediterranean fruit-fly eradication project. Allowances were made for subsequent expansions of zones 1 and 2 because of the discovery of new infestations after July 31.⁴ Obtained by dividing average number of trees per acre into total number of trees, by counties. Information on average number of trees by counties obtained from unpublished data in the Bureau of Agricultural Economics. For method see appendix 2.⁵ Distribution of trees by kinds and ages based upon data in Florida Citrus Tree Survey, S. R. Newell, Bureau of Agricultural Economics, July 1935, mimeographed.

Practically all of the destruction of commercial fruits and vegetables during the eradication campaign occurred in zones 1. In these zones, all citrus and other host fruits and vegetables susceptible of infestation were removed and no more permitted to mature until these zones were released from restriction. The clean-up work was followed with frequent applications of a sweetened bait spray at intervals of approximately a week, and sometimes less. The work of crop destruction, the clean-up of host fruits and vegetables, and spraying in zones 1 were done by the eradication forces without charge to producers.

In zones 2 and in the eradication area that was later established, fruits and vegetables were allowed to move under certain safeguards, but a general clean-up of host fruits and vegetables was required in the springs of 1929 and 1930, and a host-free period maintained during the summer months of these 2 years. Citrus groves also had to be sprayed and had to be kept clean of drops and splits during the maturing and harvesting seasons. Practically all of the labor incident to carrying out the requirements of the eradication campaign on privately owned and operated properties in zones 2, and later practically in the entire eradication area, was contributed by producers. A State-wide inspection, and the extermination measures carried on in abandoned properties, wild lands, and in many cases city properties, were performed by the eradication forces without charge to producers.

Producers outside of the eradication area were not required to adopt any extermination measures except to complete the harvesting of citrus crops by a specified date each spring, and to clean up crop remnants of the citrus crop following harvesting. Such producers also participated to some extent in a cooperative spray program in 1930.

Beginning on September 1, 1929, quarantine restrictions were applied uniformly to the eradication area other than the included zones 1. The territory within these zones 1 also became subject to the regulations of the eradication area, as already indicated, when they were made part and parcel of that area. A summary of the differences in the regulations and requirements for the eradication area and for zone 3 is shown in appendix 3.

As the campaign progressed, the failure to find new infestations, together with other evidence of complete eradication, resulted in a gradual relaxation of the eradication measures until November 15, 1930, when all quarantine restrictions on account of the Mediterranean fruitfly were removed.

(2) Measures designed to prevent the spread of the fly included the establishment of zones 2 as protective areas around points of infestation, the regulation of fruit and vegetable movements, and sanitation measures that included in some instances the sterilization of host fruits and vegetables.

KINDS OF LOSSES REPORTED BY PRODUCERS

Questionnaires were distributed by the Mediterranean Fruitfly Board through county agricultural agents' offices to producers throughout the eradication area during the summer of 1938, in order to obtain information on the kinds of losses claimed as a result of the eradication campaign. A copy of the questionnaire is shown as appendix 4 of this report. A total of 6,227 questionnaires were returned to the Board, mostly by mail.

The number of questionnaires returned does not represent all of the producers who were affected by the eradication campaign. Factors such as changes in property ownership, absentee ownership, and the failure of individuals in Florida to make returns because of failure to learn of the questionnaire survey or for other reasons, prevented a complete coverage. That the returns from producers were incomplete is indicated by the fact that the acreage in citrus reported in the questionnaires amounted to approximately 39 percent of the total acreage in citrus in the eradication area. Furthermore, a total of 15,600 grove properties were reported in the eradication area by officials connected with the eradication campaign.

The questionnaire survey does not in itself give a representative indication of money losses sustained by producers. The form used does not call for the value of citrus fruits destroyed, nor for the value of the total losses sustained by individual producers. In some cases various items were reported damaged or destroyed and no values shown, or requests were made that the Board supply value estimates. When values were estimated by producers these usually were based on market prices rather than the "in field" and "on tree" prices called for in the questionnaire.

There is evidence also that the nature of the questionnaire inquiry was frequently misunderstood. Claims were made, for example, by persons other than growers and farmers. These claims included losses to nonagricultural business interests, dealer losses, transportation losses, and others. Then, too, many producers reported losses which, in the opinion of the Board, were entirely unrelated to the eradication campaign. The apparent misunderstanding of the Board's questionnaire inquiry was caused in large part by the difficulty of indicating clearly in a mailed questionnaire the exact nature of the information desired.

It is believed, however, that the kinds of losses reported in the questionnaires represent an accurate cross section of the opinions of producers generally as to the types of damages caused by the eradication campaign. Questionnaires were obtained from every county in the eradication area. A summary of the questionnaires showing the numbers reporting various kinds of losses follows:

Number of questionnaires returned.....	6, 227
Number of questionnaires reporting citrus acreage or trees.....	5, 213
Number of questionnaires reporting:	
Citrus fruit losses (including fruit destroyed and price losses).....	4, 105
Spray damage to citrus trees (including trees killed and abnormal pruning costs).....	2, 922
Expense for picking and burying citrus drops and splits.....	1, 800
Expense for applying bait-spray.....	704
Noncitrus fruit destroyed.....	1, 559
Damage to or losses of noncitrus fruit trees.....	850
Vegetables and field crops destroyed.....	1, 815
Ornamental plants injured or destroyed.....	52
Livestock killed by bait spray:	
Horses and mules.....	21
Cattle.....	31
Hogs.....	2
Sheep or goats.....	3
Poultry.....	56
Bees (including honey).....	26
Rabbits.....	3
Miscellaneous (including real estate destroyed, losses of property from foreclosures and forced sale, dealer losses, etc.).....	60

In the remainder of this report each of the categories of loss items is considered individually in terms, first, of whether a loss did occur and, second, of the estimated value of those losses attributable to the eradication campaign. Substantiating evidence is presented to support negative as well as positive findings of loss. In the analysis and in its presentation in the following sections, the various items of losses reported were grouped as follows: (1) Destruction of crops; (2) spray damage to citrus trees; (3) additional pruning caused by spray damage; (4) spraying costs; (5) picking up drops and splits (grove clean-up); (6) sterilization losses; (7) citrus price losses; (8) livestock losses; and (9) other losses.

DESTRUCTION OF CROPS

One of the items of loss to producers—and probably the most spectacular phase of the eradication campaign—was the destruction of crops. Upon determination of an infestation on a property and the establishment of a zone 1 with its 1-mile radius around the infested property, all of the host fruits and vegetables susceptible to infestation by the fly were removed and were either destroyed or processed. During the later stages of the eradication work, the area comprised within a zone 1 was reduced to a ½-mile radius around an infested property, and, still later, destruction was limited to individual properties or parts of a property found infested. But almost all of the destruction of crops occurred during the late spring and summer of 1929, when each zone 1 comprised a 1-mile radius around the point of infestation (table 1). Some host fruits, vegetables, and plants outside of zones 1 also were eliminated by the eradication forces, but these were primarily in wild lands and in abandoned or uncared for properties.

Records of crop destruction by the eradication forces from May 6, 1929, to January 11, 1930, are filed in the Bureau of Entomology and Plant Quarantine in Washington. These records are in the form of daily reports submitted by field foremen during the course of the eradication campaign. The records of destruction by eradication forces prior to May 6, 1929, are incomplete, as were the records of destruction activities carried on under the supervision of county agents, citizens' committees, and community groups. There is evidence, however, that a large part of such destruction was reported to the eradication headquarters and included in the destruction records at hand.

The destruction records on file were summarized by Mr. Beverly S. Galloway in 1930, when he was in the employment of the Plant Quarantine and Control Administration. The resources of the Board did not permit an independent summarization of the records, but the data prepared by Mr. Galloway seemed sufficiently accurate in the judgment of the Board to justify their acceptance; hence, they were adopted as a basis for the Board's report. A copy of the report prepared by Mr. Galloway is attached hereto as appendix 5. The appended report contains destruction data by counties. Consideration is given here only to the totals reported. These totals for the period from April 1929 to January 11, 1930, are as follows:

Citrus fruits:

Commercial citrus.....	boxes..	338, 727
Other marketable citrus.....	do....	29, 433
Limes, lemons, and kumquats.....	do....	1, 385
Citrus drops and culls.....	do....	59, 523
Total, citrus.....	do....	<u><u>1 429, 068</u></u>

Noncitrus fruits:

Peaches (7 acres)-----	bushels--	1, 528
Avocados (1 acre)-----	do----	1, 903
Persimmons-----	do----	2, 132
Grapes-----	do----	4, 448
Miscellaneous fruits (3 acres)-----	do----	4, 497
Total, noncitrus fruits-----		14, 508
Total, acres-----		11

Vegetables:

Cowpeas (1,690 acres)-----	bushels--	3, 821
Beans (190 acres)-----	do----	7, 543
Peppers (196 acres)-----	do----	40, 011
Tomatoes (305 acres)-----	do----	25, 402
Miscellaneous vegetables (461 acres)-----	do----	23, 459
Total, vegetables-----		100, 236
Total, acres-----		2, 842

Miscellaneous fruits, vegetables, and other crops (acres)----- 253

¹ Field-box equivalent of 2-bushel capacity.

² Plus small quantities of miscellaneous crops.

It will be noted that the destruction reports were in terms of quantities of products in some instances, and in terms of acres cleaned up in others. The items of acres and quantities are not duplicates. That is, the acres reported are additional to the quantities reported. It was necessary, then, that the Board estimate the yields that probably would have been harvested on the acreage reported cleaned in order to estimate the total volume destroyed of each of the various items so reported. Values were then assigned to the quantities of each item in order to estimate the total value of fruits and vegetables destroyed.

The prices used in the valuations are "on tree" prices for tree crops and "in field" prices for other crops. Practically all of the marketable crops destroyed were cleaned up by eradication forces at no expense to producers. It is the opinion of the Board, therefore, that the price basis used represents a fair method of valuation in estimating producers' crop losses.

Summaries of the destruction records and of the estimated values of products destroyed are shown in tables 3, 4, and 5 for the three categories of citrus fruits, noncitrus fruits, and vegetables and field crops, respectively. The tables are largely self-explanatory. The sources of the price and other data upon which estimates of value are based are indicated in footnotes to the tables.

The Board has no quantitative basis to make a separate estimate of the value of the miscellaneous crops (53 acres and small quantities of products) shown at the bottom of the summary of crops destroyed; hence, this item is included with the miscellaneous losses discussed in the section entitled "Other losses," beginning on page 48.

DESTRUCTION OF CITRUS FRUITS

A summary of the official destruction records shows that the equivalent of 429,068 field boxes (2-bushel capacity) of citrus fruit were destroyed in connection with the eradication campaign (table 3). No estimate of value was made, however, for 59,523 boxes of citrus culls and drops reported destroyed. It is the opinion of the Board that these culls and drops, cleaned by the eradication forces at no expense

to producers, had no commercial value. Nor is it considered that the drops and splits cleaned from groves by producers outside of zones 1 had any market value; hence, such fruit is not included herein as an item of loss.

No differentiation is made in the destruction records as between oranges, tangerines, and grapefruit. In the Galloway report, 338,727 boxes are recorded as "commercial citrus" and 29,433 boxes are recorded as "noncommercial citrus." The fruit in the latter classification was reported in small lots ranging from one-eighth box to 24 boxes per property, but a value is placed on this fruit in that it apparently was marketable.

Based on the data shown in table 3, the total value of the marketable citrus fruit destroyed is estimated at \$406,400.

TABLE 3.—Quantities and "on tree" values of citrus fruit destroyed during the Mediterranean fruitfly eradication campaign, Florida, April 1929, to Jan. 11, 1930

Item	Boxes destroyed ¹	"On tree" price per box	"On tree" value
	<i>Number</i>		
Marketable citrus.....	368, 160	² \$1. 10	\$404, 976
Limes, lemons, and kumquats.....	1, 385	³ 1. 00	1, 385
Citrus drops and culls.....	59, 523	(⁴)	(⁴)
Total.....	429, 068		406, 311

¹ Packed-box equivalents. It is assumed that the 2-bushel field-box equivalent in which destruction was reported would have approximated a packed box of 13½ bushels.

² Price as of May 1, 1929, estimated from data supplied by the Florida State Marketing Bureau.

³ Estimated. Although the quantity is not known, it is probable that a considerable proportion of this fruit comprised rough lemons of little or no commercial value.

⁴ No market value.

Source: Galloway report (appendix 5), except as otherwise stated.

DESTRUCTION OF NONCITRUS FRUITS

The Board estimates that the value of the marketable noncitrus fruits destroyed during the eradication campaign amounted to a total of approximately \$31,300 (table 4). This figure represents the value of 14,508 bushels of noncitrus fruits and of the production from 8 acres, as shown in the Galloway report. It is estimated that miscellaneous noncitrus fruits from 3 acres reported destroyed represented crop remnants that had no commercial value.

DESTRUCTION OF VEGETABLES AND FIELD CROPS

It is estimated that the value of the vegetables and field crops destroyed during the eradication campaign amounted to a total of approximately \$318,000 (table 5). This figure represents the estimated value of 100,236 bushels of products reported destroyed, and of the unharvested part of the crops on 2,842 acres reported cleaned up but for which no quantities of products destroyed are shown. All cull vegetables were excluded from the records of destruction as reported in the Galloway report (appendix 5, p. 4).

For destruction items reported in terms of acres only, it was necessary, as already indicated, that estimates be made of the quantities of marketable products that would have been produced on such acres had it not been for the eradication campaign. In the case of several crops, this was complicated by the fact that the marketing season was already

under way when the destruction work was initiated, and a part of the production on the acres cleaned up had already been harvested by producers.

TABLE 4.—Quantities and "on tree" values of noncitrus fruits destroyed during the Mediterranean fruitfly eradication campaign, Florida, April 1929, to Jan. 11, 1930

Item	Destruction reported in quantities of products ¹	Destruction reported in acres			Estimated total quantity destroyed	"On tree" price per bushel	"On tree" value of products destroyed
		Acres reported ¹	Estimated yield per acre	Estimated quantity destroyed			
	<i>Bushels</i>	<i>Number</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>		
Peaches.....	1,528	7	² 50	350	1,878	³ \$1.45	\$2,723.10
Avocados.....	1,903	1	² 30	30	1,933	⁴ 2.12	4,097.96
Persimmons.....	2,132	0	-----	-----	2,132	⁵ 5.00	10,660.00
Grapes.....	4,448	0	-----	-----	4,448	⁶ 2.10	9,340.80
Miscellaneous.....	4,497	⁷ 3	-----	-----	4,497	⁸ 1.00	4,497.00
Total.....	14,508	11	-----	380	14,888	-----	31,318.86

¹ Data from Galloway report (appendix 5).

² Estimated from the United States Census for 1930.

³ Bureau of Agricultural Economics, 1929 farm price of \$1.70 minus \$0.25 for picking and hauling.

⁴ Bureau of Agricultural Economics, 1929 farm price of \$2.27 minus \$0.15 for picking and hauling.

⁵ Estimate contained in Galloway report (appendix 5, p. 6). No official data are available on persimmon prices in Florida.

⁶ Bureau of Agricultural Economics, 1929 farm price of \$2.40 minus \$0.30 for picking and containers.

⁷ Considered as crop remnants of no market value.

⁸ Estimated.

TABLE 5.—Quantities and "in field" values of vegetables and field crops destroyed during the Mediterranean fruitfly eradication campaign, Florida, April 1929 to Jan. 11, 1930

Item	Destruction reported in quantities of products ¹	Destruction reported in acres			Estimated total quantity destroyed	"In field" price per bushel	"In field" value of products destroyed
		Acres reported ¹	Estimated yield per acre	Estimated quantity destroyed			
	<i>Bushels</i>	<i>Number</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>		
Cowpeas, seed.....	3,821	0	-----	-----	3,821	² \$1.25	\$4,776.25
Cowpeas, acres.....	0	1,690	-----	-----	-----	³ 9.295.00	\$9,295.00
Beans.....	7,543	190	⁴ 52	9,880	17,423	⁵ 1.44	25,089.12
Peppers.....	40,011	196	⁶ 262	51,352	91,363	⁷ .92	84,053.96
Tomatoes.....	25,402	305	⁸ 67	20,435	45,837	⁹ 3.18	145,761.66
Miscellaneous vegetables (quantity).....	23,459	0	-----	-----	23,459	¹⁰ 1.00	23,459.00
Miscellaneous vegetables (acres).....	0	461	-----	-----	-----	¹¹ 25,544.01	\$25,544.01
Total.....	100,236	2,842	-----	-----	181,903	-----	317,979.00

¹ Data from Galloway report (appendix 5).

² Bureau of Agricultural Economics, 1929 farm price of \$2.50 minus \$1.25 for picking and hauling.

³ Based on estimated value of \$5.50 per acre, as indicated in Galloway report (appendix 5, p. 5). This value approximates the average cost per acre for land preparation, seed, and planting.

⁴ Estimated full yield of 89 bushels per acre, minus an estimated average of 37 bushels per acre harvested previous to destruction.

⁵ Bureau of Agricultural Economics, f. o. b. cash-track price of \$2 per bushel on Apr. 15, 1929, minus \$0.56 for picking, packing, container, and hauling.

⁶ Estimated full yield of 286 bushels per acre, minus an estimated average of 24 bushels per acre harvested previous to destruction.

⁷ Bureau of Agricultural Economics, f. o. b. cash-track price of \$1.20 per bushel on Apr. 15, 1929, minus \$0.28 for picking, packing, container, and hauling.

⁸ Estimated full yield of 70 bushels per acre, minus an estimated average of 3 bushels per acre harvested previous to destruction.

⁹ Bureau of Agricultural Economics, f. o. b. cash-track price of \$4.07 per bushel on Apr. 15, 1929, minus \$0.89 for picking, packing, container, and hauling.

¹⁰ Estimated.

¹¹ Estimated full value of \$131.93 per acre (based upon 1930 census reports on values of vegetables for sale in 22 counties wholly or partly in the eradication area), minus an estimated value of \$76.52 harvested previous to destruction.

In arriving at a decision on this, it was assumed that the usual proportion of the January-July carlot shipments of a crop that moves after May 1 is representative of the part of the crop that remained unharvested. In the case of beans, for example, an average of 60 percent of the carlot shipments from January through July moved after May 1 during the 6 years 1926-32, excluding 1929. It is assumed, then, that 40 percent of the crop on the bean acreage reported cleaned up had been harvested when destruction occurred. The estimated full yield of 89 bushels per acre was therefore reduced by 40 percent, or by 37 bushels, and a yield of 52 bushels used in determining the production destroyed on the acreage of beans reported cleaned up. A similar procedure was used in estimating the production of peppers and tomatoes, and in estimating the value of the acreage in miscellaneous vegetables reported destroyed.

The proportions of the carlot movements used in formulating these estimates are based on the average monthly shipments during the 6 years 1926-32, excluding 1929, from the 22 counties in the eradication area. These data are presented in table 6. It will be noted from the table that the period of the eradication campaign from April through June coincided with a period of heavy fruit and vegetable movements from Florida, and explains the large volume of marketable host products destroyed in the rapid extension of zones 1 that occurred during these 3 months in 1929.

TABLE 6.—Average number of carlots of fruits and vegetables shipped from the counties in the eradication area in Florida, by months, during the 6 years 1926-28 and 1930-32 ¹

	January	February	March	April	May	June	July
String beans.....	0.3		0.2	149.8	219.5	5.8	
Beets ²		0.5	.5	1.0			
Cabbage.....	272.8	345.4	469.8	265.2	16.8	.8	
Carrots ³							1.0
Cauliflower ²	3.5	3.5					
Celery.....	538.8	1,481.5	1,844.5	1,647.8	508.9	59.2	.3
Corn (green) ²					2.5	84.5	53.0
Cucumbers.....		3.5	30.9	258.0	766.8	83.8	
Eggplant.....	.5			.2	.6	9.2	12.2
Greens (except spinach) ³	2.0	5.0					
Lettuce and romaine.....	71.5	47.7	102.7	18.7			
Peas (green).....		1.2	1.2	1.0			.3
Peppers.....	13.8	2.1	2.0	12.0	89.2	199.0	22.3
Tomatoes.....	.2			12.0	376.0	229.5	1.3
Turnips and rutabagas ².....			.5	4.0	4.5	.5	
Cantaloups ⁴					2.4	6.6	
Watermelons.....					282.7	3,483.2	457.7
Melons (miscellaneous) ²					13.5	21.0	.5
Potatoes.....	4.5	9.7	242.5	1,682.8	2,737.5	72.4	16.4
Sweetpotatoes.....	.3	.3	.9		.3		23.3
Mixed vegetables.....	113.3	79.0	107.8	142.8	168.0	117.0	40.0
Grapes ⁵.....						.6	6.2
Pears ⁴							3.0
Strawberries.....	111.8	169.5	261.7	133.5	14.5	.5	
Grapefruit.....	1,972.7	1,817.8	2,035.2	1,692.0	947.2	214.7	13.8
Tangerines ⁴	563.7	259.7	58.0	.3			
Oranges.....	3,045.3	2,821.5	2,330.7	1,709.0	900.2	200.5	5.0
Mixed citrus.....	1,169.7	991.3	684.8	443.0	196.0	43.5	1.9
Total.....	7,884.7	8,039.2	8,173.9	8,173.1	7,247.1	4,832.3	658.2

See footnotes at end of table.

TABLE 6.—Average number of carlots of fruits and vegetables shipped from the counties in the eradication area in Florida, by months, during the 6 years 1926-28 and 1930-32—Continued

	August	September	October	November	December	Total
String beans.....			44.5	187.7	19.8	627.6
Beets ²						2.0
Cabbage.....				7.0	88.5	1,466.3
Carrots ²						1.0
Cauliflower ²						7.0
Celery.....					29.2	6,110.2
Corn (green) ²						140.0
Cucumbers.....			3.2	.8	1.0	1,148.0
Eggplant.....		0.5	13.5	21.8	5.0	63.5
Greens (except spinach) ³						7.0
Lettuce and romaine.....				117.6	177.8	536.0
Peas (green).....				1.3	1.7	6.7
Peppers.....	0.2		6.7	61.4	55.5	464.2
Tomatoes.....		.3		.2	.3	619.8
Turnips and rutabagas ²						9.5
Cantaloups ⁵						9.0
Watermelons.....	506.5	6.6				4,736.7
Melons (miscellaneous) ²						35.0
Potatoes.....	.3	.3		1.3	3.5	4,771.2
Sweet potatoes.....	4.2	.3		.2	1.0	30.8
Mixed vegetables.....	.9		22.5	128.2	162.7	1,082.2
Grapes ⁵.....	.2			.2		7.2
Pears ⁴						3.0
Strawberries.....					19.7	711.2
Grapefruit.....	3.0	97.8	888.8	1,460.7	1,350.5	12,494.2
Tangerines ⁴.....			.7	408.7	770.6	2,061.7
Oranges.....	.3	3.2	627.3	2,407.7	3,721.8	17,772.5
Mixed citrus.....	.3	1.3	219.3	899.5	1,504.7	6,155.3
Total.....	515.9	110.3	1,826.5	5,704.3	7,913.3	61,078.8

¹ The 22 counties included wholly or in part in the eradication area in 1929-30 are in the north-central part of Florida, as indicated by the heavy black lines shown in fig. 1. The data are averages for 6 years except as otherwise specified.

² 2-year average.

³ 1 year.

⁴ 3-year average.

⁵ 5-year average.

Source: Carlot Shipments of Fruits and Vegetables from Florida, 1926-32, mimeographed reports, Bureau of Agricultural Economics.

SPRAY DAMAGE TO CITRUS TREES

From the beginning of the eradication campaign until the fall of 1929, the formula for the bait spray used in connection with the eradication campaign was as follows:

Lead arsenate.....	pounds.....	8
Crude brown sugar.....	do.....	50
Molasses.....	gallons.....	10
Water.....	do.....	200

On October 24, 1929, eradication-district inspectors were instructed to cut the spray formula to 4 pounds of lead arsenate, 25 pounds of sugar, 5 gallons of molasses, and water to make 200 gallons.³ It was later determined that copper carbonate was poisonous to the Mediterranean fruitfly, and 8 pounds of that compound were substituted for the 4 pounds of lead arsenate in the latter part of 1929.

Citrus trees in zones 1 were sprayed by eradication forces. Reports of the Florida State Plant Board indicate that power sprayers generally were used in commercial groves, and knapsack sprayers on small and residence properties. Following the clean-up of a newly discovered infested area, the trees were sprayed repeatedly at short intervals, the number of spray applications amounting in some cases to as many as 19. The larger part of the acreage in zones 1 was

³ Correspondence in files of Florida State Plant Board.

sprayed from 10 to 14 times.⁴ All spraying by the eradication forces was discontinued on November 5, 1929, except in 9 zones 1 that were continued as such and sprayed by eradication forces until December 2, 1929.

The spray program in zones 2 and in that part of zone 3 that was incorporated into the eradication area was carried on by growers themselves, presumably with a more general use of knapsack sprayers than in zones 1. The larger part of the acreage in zones 2 was sprayed approximately four times. In the part of zone 3 within the eradication area, it is estimated that citrus trees received an average of two spray applications.⁵

The Board received many complaints in personal interviews with producers and from the questionnaire survey that citrus trees were injured by the arsenical spray. Of the 5,213 questionnaires received from producers who had citrus, 56 percent reported spray damage to citrus trees. A careful investigation of the evidence available convinced the Board that the arsenical spray did result in some injury to citrus trees and, consequently, in a loss to producers attributable to the eradication campaign.

EVIDENCE OF SPRAY DAMAGE TO CITRUS TREES

In addition to reports from producers, evidence supporting claims of spray damage to citrus trees is found in the published results of research conducted by workers in the Bureau of Entomology.⁶ These workers found that one application of a solution of 8 pounds of arsenate of lead to 200 gallons of water sprayed on orange trees left a residue of 0.679 milligrams of arsenic trioxide per 10 grams of leaves sprayed. When arsenate was present in this quantity or in larger quantities, the leaves were injured and many of them fell.⁷ The same kind of solution applied several times (exact number unspecified) left a residue of 2.50 milligrams of arsenic trioxide per 10 grams of leaves. Although not reported upon experimentally, it is reasonable to assume that repeated severe injury to the leaves would be reflected in loss of bearing wood, and, consequently, in some loss in production.

It is improbable, however, that the spray damage extended beyond the 1929-30 crop season, since it was found that "the greatest quantity of soluble arsenic was present immediately after spraying, and during the first month two-thirds of this disappeared."⁸

From this it may be assumed that the greatest injury to trees was sustained in zones 1 because of the larger accumulation of arsenical residue resulting from frequent sprayings, and the longer duration of the spray period.

The experimental work cited was carried on with orange trees, but the investigators state that the principles involved in the effect of arsenic on grapefruit, tangerine, and other citrus is probably the same as that involved in the effect on oranges, although the quantity of arsenic required to produce these effects may differ.⁹

⁴ Report for the period, July 1, 1928, to July 30, 1930, Eighth Biennial Report, Florida State Plant Board, 1931, p. 85.

⁵ The number of spray applications in the various zones are discussed more fully in the section entitled "Cost of Spraying," beginning on p. 26 [p. 19 of this document].

⁶ Miller, R. L., Bassett, Ione F., and Yothers, W. W., Effects of Lead Arsenate Insecticides on Orange Trees in Florida, U. S. Department of Agriculture Technical Bulletin No. 350, 1933.

⁷ *Ibid.*, p. 16, table 11.

⁸ *Ibid.*, p. 8.

⁹ *Ibid.*, p. 5.

The Board finds additional evidence of arsenical spray damage to citrus trees in the report of a grove survey conducted by five outstanding Florida citrus producers in December 1929 and January 1930. This producer committee was appointed by Dr. Wilmon Newell, then in charge of the eradication campaign, because of the numerous complaints that had been received to the effect that the spray used in the campaign was affecting the quality of the fruit and damaging the trees. The observations of the committee on conditions in the individual groves examined are presented as appendix 6 of this report. The producer committee found that claims of injury caused by the spray were often exaggerated, but that some injury actually occurred. The most numerous cases of injury, ranging from light to severe, were found in young groves less than 12 years old and when the trees had been repeatedly sprayed.

A perhaps less reliable indication of spray damage, but one still worthy of consideration, is found in the average yield per bearing orange and grapefruit tree in Florida during the 1929-30 season as compared with other seasons. Data on this, presented in table 7, show that the average yield of oranges and grapefruit per bearing tree in Florida was less during the 1929-30 season than in any of the 14 years from 1923-24 to 1936-37. Citrus production normally fluctuates widely from year to year, but it is significant that the lowest average yields during the period for which data are available coincided with the year of intensive eradication activities. These data pertain to the State as a whole, but the larger part of the citrus crop in Florida is produced in the territory that was comprised within the eradication area, and yields obtained in that area largely determine the State figure on yields.

TABLE 7.—*Production of oranges and grapefruit per bearing tree, and value per acre of fertilizers used on citrus groves, Florida, 1924-36*

Year	Oranges ¹			Grapefruit			Cost of fertilizer per acre on citrus ⁴
	Bearing trees ²	Production		Bearing trees ²	Production		
		Total ³	Per bearing tree		Total ³	Per bearing tree	
	<i>Number</i>	<i>Boxes</i>	<i>Boxes</i>	<i>Number</i>	<i>Boxes</i>	<i>Boxes</i>	
1924-----	5,617,200	11,639,000	2.07	2,712,700	9,177,000	3.38	\$34.14
1925-----	6,177,000	10,044,000	1.63	2,946,300	7,660,000	2.60	37.53
1926-----	6,800,900	11,512,000	1.69	3,117,800	8,693,000	2.79	36.12
1927-----	7,880,500	9,487,000	1.20	3,451,400	8,158,000	2.36	36.98
1928-----	8,900,200	15,588,000	1.75	3,757,900	11,314,000	3.01	39.23
1929-----	9,761,800	10,304,000	1.06	3,945,000	8,274,000	2.10	35.81
1930-----	10,547,200	19,211,000	1.82	4,055,200	16,109,000	3.97	35.97
1931-----	11,271,600	14,220,000	1.26	4,246,300	10,786,000	2.54	30.74
1932-----	12,064,600	16,200,000	1.34	4,475,700	11,800,000	2.64	24.11
1933-----	12,712,700	18,100,000	1.42	4,742,500	10,700,000	2.26	26.36
1934-----	13,428,300	17,600,000	1.31	4,980,200	15,200,000	3.05	25.96
1935-----	13,921,400	18,000,000	1.29	5,198,900	11,500,000	2.21	28.72
1936-----	14,464,000	22,500,000	1.56	5,404,200	18,100,000	3.35	32.92

¹ Includes tangerines.

² Estimated from Bureau of Agricultural Economics, mimeographed report, Florida Citrus Tree Survey, 1934, and from Florida State Plant Board reports of tree movement from nurseries to orchards.

³ From Bureau of Agricultural Economics mimeographed report, Facts Relating to the Production of Citrus Fruits, 1938. Production data are totals for the State, while the number of trees exclude the relatively small number in northwestern Florida. The difference in yield caused by this factor is practically insignificant, and probably was constant from year to year during the period shown.

⁴ From Florida Agricultural Extension Service Miscellaneous Publication 26, 1938, and Florida Agricultural Experiment Station Bull. 287, 1935.

Data on the average value of fertilizers used per acre on citrus groves are also included in table 7. These data indicate that the use of fertilizer in 1929 was approximately in line with practices in preceding years. Although prices of fertilizer declined after 1930, the low average yields per tree from 1932 to 1936 may be related to a decreased use of fertilizer rather than to the after effects of spray damage. The decreased use of fertilizer during the 1932-35 period in turn was related to the low citrus prices and incomes obtained during the depression.

It is significant to note also from table 7 the relatively large average per tree yield of oranges and grapefruit obtained during the 1930-31 crop season. This fact, together with the experimental findings that the larger part of the arsenical spray residue disappears shortly after spraying, substantiates the Board's position that the spray damage to citrus trees was temporary and applied only to the 1929-30 crop.

There is no conclusive evidence that citrus trees were killed from the effects of the arsenical sprays only. The spray perhaps may have been a contributory factor hastening tree death in some cases, but it appears probable that other factors, such as starvation, disease, or climatic factors may have been more important contributory factors.

VALUATION OF SPRAY DAMAGE TO CITRUS TREES

The evidence available indicates that only a part of the number of citrus trees sprayed were damaged. The next problem then, was to estimate the number of trees that were injured, and the total value of the damage sustained.

The number of trees damaged in zones 1 was estimated from a tabulation of the questionnaire reports from producers who had citrus. The questionnaires from Polk County were matched with 1929 ownership maps on which the boundaries of zones 1 were outlined. This permitted a segregation of the questionnaires from producers in Polk County who were in such zones. Questionnaires were then segregated for six townships in Orange County, three townships in Brevard County, and one township in Volusia County. Practically all of the citrus acreage in these selected townships was comprised in zones 1. A total of 963 questionnaires were segregated in this manner. A tabulation of these questionnaires indicated that an average of 53 percent of the citrus trees in zones 1 were reported damaged by the spray.

The fact that trees in zones 1 were heavily sprayed as compared with those in the remainder of the eradication area would indicate that the proportion of trees damaged in zones 1 was relatively high as compared with the other zones. This apparently was the case, as indicated in part by the questionnaire returns, in part by the producer-committee report in appendix 6, and in part by the observations of agricultural workers who administered the spray program. From these bases and from the questionnaire returns, the Board estimates that the proportion of citrus trees damaged in each of the three zones in the eradication area was 53 percent for zones 1, 5.3 percent for zones 2, and 0.53 percent for zone 3. These percentages were then applied to the total number of trees in each zone in the eradication area to determine the number that were damaged. Official instructions were issued to the effect that citrus trees 2 years old and under

were not to be sprayed; hence, such trees are excluded in the estimates of spray damage.¹⁰

TABLE 8.—*Estimated value of spray damage to citrus trees, by ages and by kinds, in the eradication area, Florida*

	Age of trees	Kind of tree ¹	Estimated damage per tree		Citrus trees		Value of damage
					Total ¹	Damaged ²	
	Years		Percent	Cents	Number	Number	
Zones 1-----	3-5-----	{Orange-----	(3)	50	670, 183	355, 197	\$177, 598. 50
		{Grapefruit-----					
	6-10-----	{Orange-----	60	50	1, 322, 802	701, 086	350, 543. 00
		{Grapefruit-----	20	30	294, 629	156, 153	46, 845. 90
	11 and over---	{Orange-----	30	85	1, 891, 585	1, 002, 540	852, 159. 00
		{Grapefruit-----	10	40	544, 051	288, 347	115, 338. 80
Zones 2-----	3-5-----	{Orange-----	(4)	25	1, 489, 522	78, 945	19, 736. 25
		{Grapefruit-----					
	6-10-----	{Orange-----	30	25	2, 072, 123	109, 823	27, 455. 75
		{Grapefruit-----	10	15	711, 310	37, 699	5, 654. 85
	11 and over---	{Orange-----	15	45	2, 249, 963	119, 248	53, 661. 60
		{Grapefruit-----	5	20	1, 046, 382	55, 457	11, 091. 40
Zone 3-----	0-5-----	{Orange-----			108, 810		
		{Grapefruit-----					
	6-10-----	{Orange-----	15	12	61, 341	325	39. 00
		{Grapefruit-----	5	7	11, 554	61	4. 27
	11 and over---	{Orange-----	10	30	108, 340	574	172. 20
		{Grapefruit-----	3	12	21, 955	116	13. 92
Total-----					12, 604, 550	2, 905, 571	1, 660, 314. 44

¹ Tangerine trees included with oranges.

² Based on 53 percent of the trees damaged in zones 1, 5.3 percent in zones 2, and 0.53 percent in zone 3.

³ Growth retarded 1 year.

⁴ Growth retarded one-half year.

The Board's estimates of the number of citrus trees damaged by spray in each zone, the estimated average damage per tree affected, and the total value of the damage are shown in table 8. The estimated damage per tree of various kinds and ages in the different zones was determined in consultation with agricultural research workers who were closely connected with the eradication campaign, and upon a careful consideration of all of the evidence available.

The damage to trees 3 to 5 years old was based upon the estimated set-back in maturity caused by the spray. In zones 1 it was estimated that young trees damaged by spray were set back an average of 1 year, and that those in zones 2 were set back an average of one-half year. This retardation of maturity was valued at the average cost of developing young citrus groves to the age of 5 years, when they presumably are of commercial bearing age.¹¹ It is the opinion of the Board that no spray damage occurred to young trees in that part of zone 3 that was within the eradication area.

The average damage to bearing citrus trees affected by the spray was based upon the estimated portion of the bearing surface that was injured. The evidence indicates that young trees were more susceptible to spray damage than were older trees, and that orange and tangerine trees were more seriously affected than were grapefruit trees. The estimates of the average proportionate damage per citrus

¹⁰ Mimeographed instructions to district inspectors in files of Florida State Plant Board.

¹¹ Cost estimates were based upon data in the following publications, with adjustments in cost rates to conform to 1929-30 levels: (1) Hawthorne, H. W., and Turlington, J. E., *Economic Study of Absentee Ownership of Citrus Properties in Florida*, Florida Agricultural Experiment Station Bulletin 287, 1935; and (2) Swinson, C. R., and Funk, W. C., *Economic Aspects of Citrus-Fruit Growing in Polk County, Fla.*, U. S. Department of Agriculture Bulletin 1435, 1926.

tree shown in table 8 were verified by citrus research workers who participated in the spray program of the eradication campaign.

The average proportionate damage per bearing tree was valued on the basis of average prices applied to an estimated reduction in average yields. The yield and price bases used in estimating the value of the damage to orange and grapefruit trees are shown in table 9. It is assumed that the data for oranges are applicable also to tangerines. The method of computation in determining the value of damage per bearing tree injured by spray may be illustrated as follows: For a spray-damaged orange tree in the 6-10-year age group in zone 1, a reduction of 60 percent in the average yield of 0.6 box, valued at \$1.37 per box, indicates a spray-damage loss of approximately 50 cents per tree.

TABLE 9.—*Yield per tree and "on tree" price per box of oranges and grapefruit in Florida, average 1925-26 to 1934-35*

Item	Oranges	Grapefruit
	<i>Boxes</i>	<i>Boxes</i>
Yield per tree: ¹		
6-10 years old.....	0.6	1.4
11 years and older.....	2.1	3.7
Price per box ²	\$1.37	\$1.04

¹ Calculated from Florida Agricultural Extension Service, Miscellaneous Publication 26, p. 20.

² Bureau of Agricultural Economics, Prices Received by Farmers for Farm Products, 1938. Mimeographed.

As shown in table 8, the average value of the estimated spray damage to citrus trees in the eradication area amounted to \$1,660,300. No spray damage is shown for the noneradication area, since the official regulations did not specify the use of arsenical bait-spray in that area.

ADDITIONAL PRUNING COSTS

Pruning is a usual operation in the maintenance of citrus groves. The only pruning cost attributable to the eradication campaign, then, was the additional pruning—that is, the pruning in excess of that usually done—necessary on the trees damaged by the spray program. The number of citrus trees damaged by spray were estimated as described in that section entitled "Spray Damage to Citrus Trees," beginning on page 18 [p. 13 of this document].

The total cost to producers for additional pruning related to the eradication campaign is estimated at \$148,900. The steps used in arriving at this total cost are shown in table 10. The first step was to establish normal pruning rates for trees of various ages. For bearing trees, these rates were adjusted in accordance with the proportion of spray damage per tree to arrive at an estimate of the cost of the additional pruning.

TABLE 10.—*Estimated cost of additional pruning caused by spray damage to citrus trees in zones 1, 2, and 3, by ages and kinds of trees, eradication area, Florida*

	Age of trees	Kind of tree ¹	Average cost per tree for normal pruning ²	Proportion of tree damaged	Cost of extra pruning per tree damaged	Trees damaged	Total cost
	<i>Years</i>		<i>Cents</i>	<i>Percent</i>	<i>Cents</i>	<i>Number</i>	
Zones 1-----	3-5-----	{Orange.....	5	-----	3.3	335,197	\$11,061.50
		{Grapefruit....					
	6-10-----	{Orange.....	10	{ 60	6.0	701,086	42,065.19
		{Grapefruit....					
	11 and over....	{Orange.....	25	{ 30	7.5	1,002,540	75,190.50
		{Grapefruit....					
Zones 2-----	3-5-----	{Orange.....	5	-----	1.7	78,945	1,342.06
		{Grapefruit....					
	6-10-----	{Orange.....	10	{ 30	3.0	109,823	3,294.69
		{Grapefruit....					
	11 and over....	{Orange.....	25	{ 15	3.8	119,248	4,531.42
		{Grapefruit....					
Zone 3-----	0-5-----	{Orange.....	5	-----	-----	-----	-----
		{Grapefruit....					
	6-10-----	{Orange.....	10	{ 15	1.5	325	4.88
		{Grapefruit....					
	11 and over....	{Orange.....	25	{ 5	.5	61	.30
		{Grapefruit....					
Total-----						2,885,571	148,935.49

¹ Tangerine trees included with oranges.² Based on data on labor requirements shown in U. S. Department of Agriculture Bulletin 1435, and on labor rates that prevailed in 1930.

The pruning rates for trees 3 to 5 years of age were further modified in that it is customary to prune only one-third of such trees in a given year.

Since it is the opinion of the Board that bait-spray damage was sustained only 1 year, it follows that additional pruning because of spray damage was necessary in only one season.

COST OF SPRAYING

Beginning in May 1929 the eradication regulations specified that poison bait spray be used in zones 1 and 2. Later this regulation applied also to the part of zone 3 that was included in the eradication area. Practically all of the spraying in zones 1 was done by eradication forces at no charge to producers, as was the spraying of abandoned properties, city lots, and roadsides in the eradication area. In zones 2 the regulations called for four applications of the poison bait spray in 1929. The eradication forces furnished the spray material to producers without charge, and supervised the spraying. In the part of zone 3 in the eradication area, two applications of the bait spray were required in 1929, and here again producers were furnished the spray material and the eradication forces supervised the spraying. The issuance of shipping permits to producers in zones 2 and in the part of zone 3 within the eradication area was conditioned on compliance with the spray program prescribed.

Official instructions to the eradication forces specified that citrus trees of 2 years of age and under were not to be sprayed.¹² Presumably, then, producers did not spray their young trees. In the estimates of spray costs to producers, therefore, the acreage in trees 2 years of age and less is excluded.

¹² Mimeographed instructions to district supervisors, in the files of the Florida State Plant Board.

Although considerable variation existed because of differences in types of equipment used, the application of the bait spray did not require much time per acre. Only a small "shot" of spray was applied to a part of each tree. Information in the files of the Florida State Plant Board pertaining to costs of applying spray during the eradication campaign indicates that the average cost per acre for labor used in applying spray amounted to 12 cents. The board is of the opinion that this rate per acre is reasonable remuneration for the spray labor used, and that rate was used in formulating its estimates of spraying costs to producers. No allowance is made in the Board's estimates for spray material or for equipment. The spray material was available from the eradication forces at no charge. Producers in most cases already owned the necessary spray equipment, or had ready access to such equipment.

The estimated costs to producers of complying with the bait-spray program in 1929 are shown in table 11. The total estimated cost for the eradication area amounted to approximately \$54,900.

TABLE 11.—*Estimates of the citrus acreage sprayed in connection with the eradication campaign, and of the cost to producers of spraying, by zones, eradication area, Florida, 1929*

	Acreage in citrus	Acreage of trees 2 years old and less	Acreage sprayed	Times sprayed	Labor cost per acre	Total labor cost
	<i>Acres</i>	<i>Acres</i>	<i>Acres</i>	<i>Number</i> (¹)		
Zones 1.....	90,441	19,606	70,834		(¹)	(¹)
Zones 2.....	140,574	28,102	112,472	4	\$0.48	\$53,986.56
Zone 3 ²	5,000	1,158	3,842	2	.24	922.08
Total.....	236,015	48,866	187,148	-----	-----	54,908.64

¹ Spraying done by eradication forces at no cost to producers.

² That part of zone 3 included in the eradication area.

In the summer of 1930, a cooperative spray program was initiated in both the eradication area and outside of that area. Two sprays of a copper-carbonate solution were applied. The growers did the spraying and the materials were furnished by the Florida State Plant Board and distributed through the Florida Citrus Growers' Clearing House Association. It is not clear from the regulations as to whether participation in this spray program was a requirement for the obtaining of shipping permits. Information from eradication officials indicates that producer participation was entirely voluntary. Since the evidence available indicates that spraying costs in connection with the cooperative program in 1930 were voluntarily undertaken, it is the opinion of the Board that these costs do not constitute an element of loss to producers attributable to the official requirements of the campaign. If the spray campaign in 1930 had been an official requirement, and had full producer compliance been obtained throughout the State, it is estimated that an additional producer expense of \$82,000 would need to be added to the Board's estimates of producer losses.

PICKING AND BURYING CITRUS DROPS AND SPLITS

One of the requirements of the eradication campaign was that groves be kept clean of fallen fruit and of split fruit on trees. The

issuance of shipping permits was conditioned upon compliance with this requirement. Such clean-up work is not a usual practice in the operation of citrus groves and, hence, constituted an additional cost to those growers who had to do such work.

The clean-up work in zones 1 was performed by the eradication forces until these zones were discontinued as such and made part of the eradication area, when producers themselves carried on the work. In zones 2, growers were required to do clean-up work at their own expense throughout the eradication period. Growers in the part of zone 3 included within the eradication area also were required to comply with the clean-up requirements after September 1, 1929. During the early part of the campaign, citizens' committees and civic groups aided in the clean-up work in all zones, but the actual amount of effective clean-up work contributed by these groups is unknown.

The official regulations required that crop remnants from the 1928-29 season be cleaned up in all groves soon after May 1, 1929. Beginning on September 1, 1929, growers were required to clean up their groves at semi-weekly intervals. This regulation was modified on October 11, 1929, when clean-ups at weekly intervals were specified for the remainder of the 1929-30 maturing and harvesting season. In the spring of 1930 a thorough clean-up of remnants of the 1929-30 crop was ordered completed by April 15. No clean-up work was required during the two summers of 1929 and 1930. In the fall of 1930 the regulations specified that groves be cleaned up at weekly intervals, beginning on September 1. These regulations continued in effect until all quarantine restrictions were removed on November 15, 1930.

A full compliance with the clean-up regulations would have necessitated the cleaning of a grove from 40 to 45 times. That growers objected to the performance of these requirements is evidenced by reports from inspectors and by noncompliance orders issued by campaign officials during the fall and winter of 1929. Some growers, probably limited in number, reportedly evaded the clean-up regulations in large part or entirely. On the other hand, there were growers who scrupulously cleaned their properties in accordance with regulations. But since there is no way of estimating the proportion who complied fully with the regulations, it is impossible to do more than estimate the average compliance.

The work of cleaning groves of drops and splits was expensive. The regulations required that the collected fruit be treated with oil or lime, buried in pits, and covered with not less than 3 feet of dirt. Information based on correspondence between officials of the eradication forces in the files of the Florida State Plant Board indicates a cost of 56 cents per acre per clean-up for young groves. Reports from a number of producers indicate a cost of 75 cents per acre per clean-up. These costs would vary, however, according to ages of groves, the volume of drops and splits, and the proportions of the trees of early and of late varieties.

Assuming average compliance and making allowance for the work done by citizens' committees and civic groups, the Board estimates that the average cost per acre of bearing citrus of the clean-up work performed by growers in the eradication area amounted to \$5 in zones 1, \$7.50 in zones 2, and \$6.50 in the part of zone 3 comprised within

the eradication area. These rates cover the clean-up work in the 1929-30 season and in the fall of 1930. It is estimated by the Board that the total cost of the clean-up work to producers in the eradication area amounted to approximately \$1,062,300 (table 12).

TABLE 12.—*Estimated cost of clean-up work to growers in the eradication area, May 1929 to Nov. 15, 1930*

	Beginning of period	Acres in bearing citrus trees	Clean-up cost per acre	Estimated total cost
		<i>Number</i>		
Zones 1.....	Oct. 14, 1929	60, 785	\$5. 00	\$303, 925. 00
Zones 2.....	May 1, 1929	98, 362	7. 50	737, 715. 00
Zone 3 ¹	Sept. 1, 1929	3, 171	6. 50	20, 611. 50
Total.....		162, 318	-----	1, 062, 251. 50

¹ Includes only that part of zone 3 that was within the eradication area.

The official regulations called for a spring clean-up in groves outside of the eradication area in both 1929 (by June 15), and in 1930 (by Apr. 15). These outside clean-ups apparently were not made a condition for the issuance of shipping permits, and, hence, apparently were purely voluntary. In view of the difficulty in securing compliance in the eradication area, it is doubtful that any great amount of clean-up work was done by growers in the noneradication area. The Board has no basis for estimating the amount of such work as may have been done, and, hence, has not included the noneradication area in its estimates of producers' costs because of clean-up work performed. If those regulations had been fully complied with, the estimated cost of such clean-up work to growers in the noneradication area is estimated at \$118,110.¹³

STERILIZATION OF FRUIT

The Board received no complaints in its questionnaire inquiry that sterilization affected products other than citrus fruits, nor is there evidence of such complaints in the literature available on the eradication campaign. Of the questionnaires received by the Board in 1938, a large number cited sterilization as a cause of low quality of citrus fruits during the eradication campaign. The exact number of producers reporting such losses is indeterminate in that losses ascribed to sterilization usually included additional factors.

The official regulations in respect to sterilization may be summarized briefly as follows:¹⁴

Sterilization before shipment of all host fruits produced in infested areas was mandatory for the 1929-30 season. Movement was restricted to the 11 Northeastern States until November 21, 1929, and then permitted to move into States other than the 10 Southern and 8 far Western States (sec. A (5) (a) of regulation 3, effective September 1, 1929, and as revised November 21, 1929).

Host fruits produced in the eradication area but outside of infested areas could be shipped into the Northeastern States without sterilization, and, if sterilized, into all States except the Southern and far Western States. Sterilized shipments into Southern and far Western States permitted from November 21, 1929, to February 28, 1930 (sec. A (5) (b) of regulation 3, and as modified).

¹³ The acreage in bearing citrus trees in the noneradication area in 1929 amounted to 98,425 acres according to unpublished compilations made by eradication officials, and available in the files of the Bureau of Entomology and Plant Quarantine. The cost of each of the two clean-ups was estimated at \$0.60 per acre.

¹⁴ Federal Plant Quarantine 68, regulation 3, sec. A (5) (a), revised effective September 1, 1929.

Host fruits produced in an infested State but outside of regulated areas could move anywhere in the United States, but had to be sterilized for shipment into the Southern and far Western States (sec. A (5) (c) of regulation 3).¹⁵

The above rules were modified to some extent during the campaign, and less than 14 percent of the 40,011 cars of citrus fruits shipped during the 1929-30 season were sterilized. Of the approximately 5,350 carlots sterilized, 4,498 were sterilized with heat.¹⁶

The methods of sterilization approved by the Department of Agriculture for citrus fruits were:

1. *Cold*.—(Authorized September 20, 1929.) Cool to 28° and hold at that temperature for 5 hours. Then raise to 30° and hold for 5 days. This was later modified to a temperature of 30° to 31° for 15 days (Plant Quarantine and Control Administration 271, March 4, 1930).

2. *Heat*.—(Authorized for grapefruit October 23, 1929. Authorized for oranges and tangerines, November 27, 1929.) Heat to 110° (center of fruit) and hold at that temperature for 8 hours (Plant Quarantine and Control Administration 246, 247, 255).

The only specific evidence that the Board has on the effect of sterilization on citrus fruits are tests conducted by Dr. L. A. Hawkins, of the Bureau of Entomology and Plant Quarantine. These tests indicate that sterilization conducted in accordance with methods recommended by the Department of Agriculture did not lower the quality of citrus fruits, and that the insipid taste of fruit that had been both sprayed and sterilized was traceable to the effect of the arsenical spray rather than to sterilization.

The tests by Dr. Hawkins also indicate, however, that improper sterilization practices or the use of faulty equipment could, of course, injure the quality of fruit. Temperatures higher than a range of from 110° to 115° were not in accordance with quarantine specifications and, on the basis of Dr. Hawkins' observations, the Board concludes that any resultant injury to citrus was attributable to faulty packing-house operation or equipment rather than to the eradication-campaign requirements.

The cost of sterilization was an additional expense to growers. This cost amounted to approximately 10 to 12 cents per box, according to reports from producers and packing-house operators. But in the section of the report entitled "Price Losses on Citrus," beginning on page 33, the loss or margin is computed on the basis of "on-tree" prices, and, hence, any additional marketing cost caused by sterilization is included in the margins and differentials shown.

PRICE LOSSES ON CITRUS

Of the 5,213 questionnaires received by the Board from producers who had citrus, 79 percent reported citrus-fruit losses and citrus-price losses during the 1929-30 season because of the effects of the eradication campaign. The number reporting each item is indeterminate from the questionnaires, in that the two items frequently were reported together. The opinion that the campaign resulted in citrus price losses to producers was also held by a number of packing-house operators who were interviewed personally.

¹⁵ Plant Quarantine and Control Administration 254, effective November 29, 1929, permitted sterilized shipments anywhere in the United States between that date and February 28, 1930.

¹⁶ Yearly Report—Packing and Shipping Division, Mediterranean Fruitfly Eradication Project, U. S. Department of Agriculture, Plant Quarantine and Control Administration, mimeographed, September 12, 1930.

The citrus price losses reported were ascribed primarily to heat sterilization, and to the insipid taste of citrus that was heavily sprayed with arsenate of lead. It is shown elsewhere in this report that sterilization operations conducted in accordance with official regulations did not affect the quality of citrus fruit;¹⁷ hence, whatever losses occurred in prices must be ascribed to other factors.

The application of heavy or repeated doses of strong arsenical sprays to citrus results in fruit of an insipid, watery taste. This is shown by experimental tests that indicate a marked reduction in the ratio of acids to solids in citrus juices from sprayed trees. Miller, Bassett, and Yothers, in experiments conducted at Orlando, Fla., showed that one application of arsenical spray solution of the strength used during the eradication campaign increased the ratio of solids to acids in orange juice to 20 to 1 as compared with a ratio of only 7.5 to 1 in the no-treatment check.¹⁸

In the eradication area, as already indicated, some of the groves in zones 1 were sprayed with the arsenical bait-spray as many as 19 times, while from 2 to 4 applications of that spray were used in zones 2 and that part of zone 3 comprised within the eradication area in 1929. Thus there is basis for concluding that the spray program in the eradication area in 1929 lowered the quality of the 1929-30 citrus crop in that area.

Another reason given for lower prices than normally would have prevailed in the eradication area were the regulations in respect to the destination of citrus shipments. During the 1929-30 season, citrus from zones 1 had to be sterilized and could be shipped only to the Northeastern States and the District of Columbia; citrus from zones 2 and from that part of zone 3 that was included in the eradication area could be shipped to the Northeast without sterilization and later to other States with sterilization; while fruit outside of the eradication area could move anywhere within the United States, except that it had to be sterilized for shipment into the 8 far Western States and into the 10 Southern States. It is not known to what extent the regulations in regard to shipment destinations affected prices. But it is probable that the effect was small, since a large portion of the Florida citrus crop normally is shipped to Northeastern markets.

Perhaps an important factor also influencing prices in the eradication area during the campaign was the possibility of a dealer or consumer discrimination against fruit believed likely to be infested with larvae or subjected to severe sanitation treatment. The operation of this largely psychological factor is unknown, however, except insofar as it was reflected in prices paid.

A study of the situation by the Board shows that producers in the eradication area did sustain price losses during the 1929-30 season to the extent of an estimated average of 40 cents per box of oranges and tangerines, and an estimated average of 15 cents per box of grapefruit. On the basis of the number of boxes of fruit shipped from the eradication area during the 1929-30 crop season, the estimated price losses amounted to approximately \$2,538,000 in the case of oranges and tangerines and to \$614,000 in the case of grapefruit, or a total of \$3,152,000 for the eradication area. The bases upon which these estimated losses were determined are described in the remainder of this section.

¹⁷ See section beginning on p. 31 [p. 22 of this document.]

¹⁸ Miller, R. L., Bassett, Ione P., and Yothers, W. W., Effect of Lead Arsenate Insecticide on Orange Trees in Florida, U. S. Department of Agriculture Technical Bulletin No. 350, 1933, table 11, p. 16.

THE ANALYSIS USED

Two possible approaches were considered in determining whether producers in Florida sustained price losses on citrus as a result of the eradication campaign. One approach considered was to determine the prices received for different lots of fruit of the same kind and grade, sprayed and not sprayed, sold in the same market area at approximately the same time. A similar procedure could have been used as a further check on whether citrus prices were influenced by sterilization. The data necessary for such determinations are available in packing-house records, and undoubtedly this method would have provided the most desirable basis for decision as to the effect of the eradication campaign on citrus prices. But a test tabulation showed that the approach would have required larger expenditures than the Board funds would permit, and a shorter alternative method was adopted.

The alternative method used was to obtain information on annual citrus shipments and prices for packing houses, separated as between the eradication area and the noneradication area, for a period of 10 years beginning with the 1925-26 crop season.¹⁹ This permitted comparison of the price differentials that normally prevail for various kinds of citrus fruits as between the two areas, and of the differentials that prevailed during the eradication period. A comparison of these differentials constituted the starting point in the analysis.

The analyses for oranges and grapefruit are discussed separately. Tangerine production south of the eradication area is relatively small, and it was not possible to obtain an adequate sample for separate analysis. It is assumed, however, that the price determinations made for oranges were also applicable to tangerines. Nor was it possible from the data available to make a study of prices by varieties of citrus fruits and as between the east coast and the remainder of Florida, although it is probable that important variations existed as between them.

PRICE DIFFERENTIALS FOR ORANGES

Data on the quantities and prices of oranges sold from representative packing houses in the eradication area and in the noneradication area are shown in table 13. Data on quantities are included in the table to indicate the large sample upon which the price data are based. It will be noted from the table that prices in the eradication area were lower than in the noneradication area only in 1929-30, the eradication year, and in 1934-35, when a severe freeze in the northern part of Florida greatly lowered the quality of citrus in that part of the State. Excluding the 1929-30 eradication year, the weighted average price per box for the other 9 years shown was 11.7 percent higher in the eradication area than in the noneradication area, although considerable variation existed from year to year. This average differential prevailed, however, despite freezes that may have lowered the quality of citrus in parts of the eradication area in 1926-27, 1927-28, and 1934-35.

¹⁹ The term "noneradication area" as used in this section of the report pertains to the territory that lay south of the eradication area in 1929-30. Relatively little citrus is grown in the part of Florida that was north and west of the eradication area; hence, citrus prices obtained by producers in that section of the State are not included in the analysis.

TABLE 13.—*Quantity and price per box of oranges sold by representative packing houses in the eradication area and noneradication area, Florida, 1925-34*

Year	Boxes sold ¹		Price per box ²		Price difference in favor of eradication area	
	Eradication area houses	Noneradication area houses	Eradication area houses	Noneradication area houses		
	<i>Boxes</i>	<i>Boxes</i>			<i>Cents</i>	<i>Percent</i>
1925-26.....	1, 105, 000	362, 000	\$2. 33	\$2. 08	25	10. 7
1926-27.....	1, 270, 000	262, 000	1. 51	. 81	70	46. 4
1927-28.....	1, 101, 000	172, 000	3. 21	3. 07	14	4. 4
1928-29.....	2, 142, 000	416, 000	. 73	. 56	17	23. 3
1929-30.....	1, 590, 000	384, 000	1. 78	2. 26	-48	-27. 0
1930-31.....	2, 447, 000	628, 000	1. 21	1. 02	19	15. 7
1931-32.....	1, 374, 000	306, 000	1. 33	1. 06	27	20. 3
1932-33.....	1, 748, 000	275, 000	. 55	. 44	11	20. 0
1933-34.....	1, 096, 000	123, 000	. 91	. 80	11	12. 1
1934-35.....	1, 383, 000	269, 000	. 84	1. 00	-19	-22. 6

¹ Packed boxes or equivalent.² Adjusted to "on-tree" basis.

Source: Packing-house records, Florida.

Differences in climatic conditions were not an important factor influencing citrus prices as between the two areas in 1929-30. If the average price differentials had prevailed that year, the average price per box of oranges in the eradication area would have amounted to \$2.58, or 11.7 percent above the price in the noneradication area. Actually, as shown in the table, the 1929-30 price in the eradication area amounted to only \$1.78 per box, or 74 cents less than normally might have been expected from the usual relationship between the two areas.

These preliminary indications are corroborated by a statistical analysis of factors affecting orange prices in the eradication area during the 10-year period 1925-34. The details of the analysis are shown in appendix 7 (A). The prices for the eradication area used in the analysis are the same as those shown in table 13. In brief, the analysis involves a statistical evaluation of prices in the eradication area as affected by (1) the size of the total Florida orange crop; (2) the size of the California navel-orange crop, which competes with the Florida orange crop; and (3) consumer demand as measured by the index of nonfarm income (September-June average, 1924-29 equals 100). Assuming the existence of normal relationships as between these factors during the 1929-30 season, the analysis shows that the average price per box of oranges in the eradication area was approximately 75 cents too low, or almost exactly the same difference as indicated in the preliminary determinations.

Several factors, singly or in combination, may have influenced the orange price differentials as between the eradication and the noneradication areas in the 1929-30 season. The quality, and, hence, the price of oranges from the eradication area in 1929-30 may have been lowered by the effects of the arsenical bait-spray program followed in that area in 1929. Another factor is that citrus fruits from the noneradication area had access to southern and western markets barred to fruit from the eradication area. Then, too, fruit from the noneradication area, known or believed to be free from infestation

and not subjected to spraying, may have been preferred on the markets.

It is the opinion of the Board, however, that all of the apparent differential in orange prices as between the eradication area and the noneradication area in 1929-30 cannot justifiably be claimed as a loss attributable to the eradication campaign. There is evidence that citrus prices in the noneradication area were stimulated by the eradication campaign, and that possibly a part of the orange price differentials as between that area and the eradication area may be accounted for by that factor. Indication of this is given by a statistical analysis of orange prices in the noneradication area, using the same production, competition, and demand factors discussed in connection with the analysis of orange prices in the eradication area. The details of the analysis are shown in appendix 7 (B). It is estimated from this analysis that the price per box of oranges in the eradication area was approximately 10 cents higher in 1929-30 than normally might have been expected from the production and demand conditions operating that year.

Then, too, in analyzing the effects of the eradication campaign on citrus prices in the eradication area, it is important to consider also the effects of that campaign on the size of the crop. There is evidence that the spray program in 1929 caused a reduction in the 1929-30 Florida citrus crop. This was taken into account in estimating the value of bait-spray damage to citrus trees, considered elsewhere in this report. This estimated reduction in production, together with the prohibition on shipment of citrus culls, resulted in a smaller total commercial crop than might otherwise have been obtained. This smaller crop in turn probably was reflected in a higher level of citrus prices in the eradication area and in the remainder of the State than might have prevailed with a larger crop.

It would appear, then, that the crop-reduction influence of the eradication campaign served also to increase the general level of orange prices in Florida. That this probably occurred is indicated by a comparison of the actual price situation in 1929-30 with the probable situation that would have prevailed without any reduction in production because of the spray program.

The probable citrus price situation that would have prevailed without attributing any reduction in orange production to the eradication campaign was approximated statistically for the eradication and noneradication areas from the analyses in appendix 7. In the case of oranges, the first step in the analysis was to estimate the reduction in the 1929-30 Florida orange crop that was considered attributable to the eradication campaign. This estimated reduction was then added to the actual production that year and an estimate made of the probable prices that would have prevailed with the larger crop.

It is not known, of course, to what extent the size of the commercial citrus crop in Florida may have been lowered by factors connected with the eradication campaign. Estimates were made, in a preceding section of this report, of the spray damage to orange trees and of the reduction in average production caused by such damage. These estimates indicate that the 1929-30 Florida orange crop was reduced by approximately 941,600 boxes because of the effects of the spray

program in the eradication area.²⁰ The addition of this estimated reduced production to the 10,300,000 boxes actually produced in Florida that year would have resulted in a crop of 11,200,000 boxes.

The average relationships as between the production and demand factors shown in appendix 7 (A) indicate that a Florida orange crop of 11,200,000 boxes in 1929-30 would have reduced orange prices in the eradication area by approximately 36 cents per box. From this, it would appear that the eradication campaign resulted in a price loss of only approximately 39 cents per box of oranges in the eradication area instead of the loss of 75 cents per box shown in our first approximation.

Prices in the noneradication area also would have been lowered had no spray damage and reduction of production occurred in the eradication area. The production and demand relationships shown in appendix 7 (B) indicate that a Florida orange crop of 11,200,000 boxes in 1929-30 also would have reduced prices in the noneradication area by approximately 26 cents per box. But a general lowering of Florida orange prices in 1929-30 because of the effects of the larger crop only would still have resulted in relatively more favorable prices in the noneradication area than in the eradication area because of the other factors, already discussed, that may have contributed to relatively lower prices in the latter area.

From a review of these statistical indications and of the qualitative considerations involved, it is the opinion of the Board that factors relating to the eradication campaign resulted in an average price loss of from 35 to 45 cents per box of oranges and tangerines produced in and shipped from the eradication area in the 1929-30 season. On the basis of the 6,346,080 boxes of oranges and tangerines shipped from the eradication area in the 1929-30 season, and of an average loss of 40 cents per box, the total price losses on these two classes of fruit are estimated at approximately \$2,538,000. There is no indication that any price losses on oranges and tangerines were sustained as a result of the eradication campaign in 1930.

PRICE DIFFERENTIALS FOR GRAPEFRUIT

The study of possible price losses on grapefruit because of the eradication campaign was in the same direction as described for oranges in the preceding section. Data on the quantities and prices of grapefruit sold from representative packing houses in the eradication and noneradication areas during the 10 years 1925-34 are shown in table 14. Ordinarily, as indicated in the table, grapefruit prices are not greatly different as between the two areas, and, on the average for the 9 years excluding 1929-30, tended to be slightly higher in the noneradication area. In the 1929-30 season, however, the price differentials as between the two areas were unusually wide, and amounted to 73 cents in favor of the noneradication area. If the 9-year average price relationship as between the two areas had prevailed that year, the average price per box of grapefruit in the eradication area would have amounted to \$2.10, or 8.4 percent lower than the price in the noneradication area. Actually, as shown in the table, the 1929-30 price in the eradication area amounted to only \$1.56 per box, or 54 cents less than might have been expected from the average price relationship as between the two areas.

²⁰ For a fuller discussion of the bases used in making this estimate, see section entitled "Spray Damage to Citrus Trees" beginning on p. 18 [p. 13 of this document].

TABLE 14.—Quantity and price per box of grapefruit sold by representative packing houses in the eradication area and noneradication area, Florida, 1925-34

Year	Boxes sold ¹		Price per box ²		Price difference in favor of eradication area	
	Eradication-area houses	Noneradication-area houses	Eradication-area houses	Noneradication-area houses	Cents	Percent
	<i>Boxes</i>	<i>Boxes</i>				
1925-26.....	901,000	333,000	\$1.68	\$1.65	0.03	1.8
1926-27.....	1,461,000	362,000	1.00	1.05	-.05	-5.0
1927-28.....	993,000	345,000	1.83	2.23	-.40	-21.9
1928-29.....	1,824,000	515,000	.89	.92	-.03	-3.4
1929-30.....	1,146,000	461,000	1.56	2.29	-.73	-46.8
1930-31.....	2,153,000	598,000	.44	.42	.02	4.5
1931-32.....	1,510,000	378,000	.64	.59	.05	7.8
1932-33.....	1,206,000	303,000	.38	.47	-.09	-23.7
1933-34.....	821,000	134,000	.73	.70	.03	4.1
1934-35.....	851,000	408,000	.43	.42	.01	2.3

¹ Packed boxes or equivalent.² Adjusted to "on tree" basis.

Source: Packing-house records, Florida.

As in the case of oranges, however, there is indication that the wide differentials in grapefruit prices as between the two areas in 1929-30 may have resulted in part because prices in the noneradication area were abnormally high. Evidence of this is furnished by a statistical analysis of the usual relationship of grapefruit prices in the two areas to production and demand factors during the 10-year period 1925-34. The details of the analyses of grapefruit prices are shown in appendix 7 (C) for the eradication area and in appendix 7 (D) for the noneradication area. The total production of grapefruit in Florida and the index of nonfarm income were used as the production and demand factors, respectively, during the 10 years studied.

These statistical analyses show that the average "on tree" price per box of grapefruit in the noneradication area in 1929-30 was approximately 31 cents higher than normally might have been expected. In the eradication area, on the other hand, the price apparently was 18 cents less per box than normally might have been expected.

The relatively unfavorable grapefruit prices in the eradication area in 1929-30 may have been related to the quality-lowering effect of the arsenical bait spray used in 1929. Other factors influencing price differences as between the two areas may have included decreased competition from eradication-area fruit in certain markets, and price psychology against sprayed fruit or fruit believed likely to be infested.

But here also, as in the case of oranges, there is evidence that grapefruit production was lowered in 1929-30 because of spray damage to trees in the eradication area. Estimates were made, in a preceding section of this report, of the average spray damage to grapefruit trees and of the reduction in average production caused by such damage. These estimates indicate that the 1929-30 Florida grapefruit crop was reduced by approximately 165,500 boxes because of the effect of spray damage on grapefruit trees in the eradication area.²¹

Had the 1929-30 Florida grapefruit crop been larger by this number of boxes, the production and demand relationships shown in appendix 7 (C) indicate that grapefruit prices would have been lowered by approximately 5 cents per box in the eradication area. From this, it

would appear that the eradication campaign resulted in a price loss of only approximately 13 cents per box of grapefruit in the eradication area instead of the losses of 54 cents or 18 cents shown in our first approximations.

After a careful consideration both of the statistical indications and of the qualitative considerations involved, it is the opinion of the Board that the eradication campaign resulted in a loss of from 10 cents to 20 cents per box of grapefruit shipped from the eradication area in the 1929-30 season. On the basis of the 4,093,920 boxes of grapefruit shipped from the eradication area that season and of an average loss of 15 cents per box, it is estimated that the total loss on grapefruit prices because of the eradication campaign amounted to approximately \$614,000. There is no indication that any price losses on grapefruit were sustained as a result of the eradication campaign in 1930.

LIVESTOCK LOSSES

Reports of livestock losses from arsenical-spray poisoning during the eradication campaign were numerous. The Board likewise was informed in personal interviews with producers and from its questionnaire survey in 1938 that livestock death losses were sustained because of arsenical-spray poisoning. Of the 6,227 questionnaires received by the Board in its inquiry, 107 reported livestock losses as a result of ingestion of arsenic in the bait spray used during the campaign.

Dr. Wilmon Newell, testifying at Orlando, Fla., at the hearing before the special subcommittee of the House Committee on Appropriations, questioned any death losses of animals attributed to poisoning from the arsenical bait-spray. Dr. Newell, as a part of his statement, said, "On the contrary, there was a very marked tendency on the part of people that when their animals died during this period, during which the spraying was conducted, to ascribe it to the use of an arsenic poison."²²

A considerable number of animals reported killed by spray poisoning during the eradication campaign were examined by the veterinarian of the Florida Agricultural Experiment Station. His report, contained in the files of the Florida State Plant Board, gives the following diagnoses of the cases that he examined:

Horses: Impaction colic.....	1
Cattle: Anaplasmosis.....	6
Hogs: Hog cholera.....	48
Turkeys:	
Blackhead.....	100
Turkey pox.....	10
Overfeeding.....	5
Tapeworm.....	8

Dr. Newell, in his testimony before the congressional subcommittee already referred to, gave the following causes of the deaths of chickens that died in the eradication area:²³

Bronchitis.....	27	Catarrh of the crop.....	5
Coccidiosis.....	32	Nutritional disease.....	30
Cholera.....	10	Roup.....	66
Colds.....	86	Typhoid.....	29
Crop bound.....	5	Ticks.....	10
Diphtheria.....	40	Intestinal parasites.....	112
Eggbound.....	3	Starvation.....	2

The evidence cited would indicate that spray poisoning was not a factor in the deaths of livestock in Florida during the eradication campaign. The evidence that poultry were not poisoned as a result of consuming the arsenical bait-spray solution is further substantiated by the published results of an experiment conducted at the Florida State Agricultural Experimental Station.²⁴ In this test chickens were given the spray solution to drink and were fed with spray-soaked feed and powdered lead arsenate. Deaths did not occur until the doses fed were very large. From this, it appeared impossible to the investigators that chickens could consume enough solution or sprayed foliage in a sprayed grove to suffer from the effects of lead arsenate poisoning. The conclusions given in the report of the experiment are:

Lead arsenate will produce death in chickens when fed in large quantities.

There appeared to be no definite correlation between the weights of the birds and a lethal dose of lead arsenate.

Lead arsenate spray solution of the strength used in these tests is apparently not harmful to chickens when consumed with feed and water continually for 60 days. A bird may consume as much as 13 grains per day for 60 days without suffering any ill effects.

Evidence in respect to the poisoning of cattle by arsenate of lead is contained in a report issued by the Massachusetts Agricultural Experiment Station.²⁵ In an experimental test, 5 cows were fed varying quantities of arsenate of lead for different periods of time. In the report on the experiment the following statement appears:

A mixture of 10 pounds of arsenate of lead to 100 gallons of water contains 45.3 grams of arsenate to the gallon. In the case of cow No. 1, 29 grams, administered at the rate of a gram per day, produced violent symptoms of poisoning. With animal No. 2, 16.5 grams, given in daily doses of one-half gram per day, caused violent purging, loss of appetite, and paresis. No. 3 took 151 grams in 2-, 3-, and 4-gram doses daily before equally marked symptoms of poisoning appeared. With No. 4, 28.35 grams given at one dose in capsule at 9:45 a. m. produced toxic effects in less than 24 hours, from which the animal did not recover completely for 6 or 7 days. In the case of No. 5, 56.70 grams caused death in 69½ hours.

This experiment shows that lead arsenate fed in large quantities is fatal to cattle, but it is improbable that a cow could consume enough bait-spray arsenate in sprayed groves in Florida for fatal results to occur. Information from eradication officials indicates that only 1 pint or less was sprayed per citrus tree, or approximately 9 gallons per acre. Assuming a drip to the ground of 1 gallon in 10 of the spray solution, approximately 0.9 gallon of the solution would fall on vegetation beneath the trees or would be absorbed in the soil. This amount of spray drip of a solution of 8 pounds of lead arsenate to 200 gallons of water would contain approximately 16 grams of arsenate of lead. Assuming that all of the drip fell on the grass beneath the sprayed trees, it would be necessary for a cow to consume all of the vegetation beneath the trees from 1 acre of sprayed grove in order to assimilate 16 grams of arsenate. It would appear physically impossible, then, for bait-spray poisoning to be fatal to cattle under these circumstances, particularly since a part of the spray drip probably

²⁴ For a fuller discussion of the bases used in making this estimate, see section entitled "Spray Damage to Citrus Trees" beginning on p. 18 [p. 13 of this document].

²⁵ Mediterranean fruitfly hearing conducted at Orlando, Fla., by the special subcommittee of the House Committee on Appropriations, 71st Cong., 2d sess., 1930, p. 201.

²⁶ *Ibid.*, p. 202.

²⁷ Thomas, E. F., and Shealey, A. L., Lead Arsenate Poisoning in Chickens, *Journal of Agricultural Research*, vol. 45, No. 5, September 1932.

²⁸ Paige, James B., Cattle Poisoning From Arsenate of Lead, Twenty-First Annual Report of the Massachusetts Agricultural Experiment Station, Public Document No. 13, January 1909, p. 183.

was absorbed into the soil. Then, too, a part of the bait spraying in Florida was with a solution of only 4 pounds of lead arsenate to 200 gallons of water.

The report on the cattle experiment also cited an earlier test by A. H. Kirkland, reported in "Agriculture of Massachusetts" for 1897. In this test, a horse was fed two large feeds of grass taken from beneath a pear tree that had been heavily sprayed with a solution of 20 pounds of arsenate of lead to 150 gallons of water. The tree had been so heavily sprayed that its foliage showed considerable burning. The grass under the tree also was given a direct application of the arsenical spray solution. The horse showed no ill effects from eating the grass.

From the above it appears that there was little, if any, death loss of livestock which could primarily be ascribed to spray poisoning related to the eradication campaign. Consequently, the Board made no allowance for this item in its estimates of producer losses attributed to the eradication campaign.

OTHER LOSSES

Included in the reports of losses related to the Mediterranean fruit-fly eradication campaign were a large number of miscellaneous items. The nature of these items is such that the Board was unable to find adequate bases for individual evaluations. In many cases certain of these loss items reported were clearly not "losses sustained by growers and farmers" as specified in the language of the act authorizing the work of the Mediterranean Fruitfly Board. Such losses were ruled out by the Board as being beyond the scope of its investigation. A careful review was then made of the other loss items which could be classed as producer losses and which were reported caused by the effects of the eradication campaign. From this review it was concluded by the Board that \$350,000 would be adequate to cover those miscellaneous losses that the Board considered attributable or related to the eradication campaign.

The remainder of this section of the report will be concerned with a description of the miscellaneous items of loss that were reported as caused by the campaign.

DESTRUCTION OF PLANTS OTHER THAN CITRUS

In the 1938 questionnaire survey, a considerable number of producers reported the destruction of trees, plants, and shrubs. The reported destruction of citrus trees is discussed in another section of this report, beginning on page 18 [p. 13 of this document]. The non-citrus trees, shrubs, and other plants reported destroyed include items such as mulberries, figs, guavas, plums, loquats, bananas, ornamental shrubs, etc. Some of these fruits and plants, which ordinarily are grown for home use, either were not marketable or had a very limited market. Some of them were wild or semiwild. An additional consideration is that certain of the crops reported destroyed, such as guavas and figs, will resume growth from roots left in the soil.

While these miscellaneous crops and plants were not grown in large quantities, they were widely distributed on properties within the eradication area.

DESTRUCTION OF MISCELLANEOUS CROPS

In an earlier section entitled "Destruction of Crops," beginning on page 12 [p. 8 of this document], reference was made to miscellaneous crops that were reported destroyed in connection with the eradication campaign. As stated in that section, the Board has no basis for making a separate estimate of the value of these crops, hence they are included in the estimate of total miscellaneous losses. The miscellaneous crops reported destroyed included strawberries, guavas, blackberries, bananas, garden greens, miscellaneous fruits, and others.

FERNERIES AND NURSERIES

The asparagus fern, a commercial crop of Florida, was considered a host plant and as such a considerable quantity of such plants were destroyed or shipments prohibited.

Some reports received from nursery operators also indicated losses related to the eradication campaign. The Board has no basis for believing that citrus nursery stock was sprayed in connection with the eradication campaign, in that spray supervisors had been instructed not to spray citrus trees of 2 years of age and under. The restriction of nursery shipments may have reduced the income to nursery operators during the quarantine period, but there is no indication that the regulations added to nursery-maintenance expenses.

BEES AND HONEY

Twenty-six growers reported the loss of bees and honey because of the effects of the arsenical spray. The United States census as of April 1, 1930, reports 1,500 farms in the eradication area on which bees were found. There is no experimental evidence on this, but it may be possible that the arsenical spray solution used in connection with the eradication campaign did result in the death of bees and in injury to the quality of honey.

PROPERTY DESTROYED

Several of the questionnaires received reported the destruction of property by eradication forces, either through accident or negligence. Such items included broken gates, fences damaged, buildings burned, and others.

VOLUNTARY COMMUNITY AND OTHER EXPENDITURES

Citizens' committees and civic organizations of various types made substantial voluntary contributions to the eradication campaign. Funds as well as work were furnished. It is the opinion of the Board that these contributions do not represent losses by farmers and producers, hence their value is not included in the Board's estimates of such losses. But these voluntary contributions were so important and represented such a significant aid to the progress of the eradication campaign that mention should be made of them in this report.

The amounts of the voluntary expenditures incurred by counties, municipalities, civic organizations, etc., on Mediterranean fruitfly work in the State of Florida from the beginning of the campaign to

the end of June 1929, as indicated in a questionnaire survey conducted by the Florida State Plant Board in 1929, are as follows:²⁶

Money spent, and equipment or labor donated or used by private individuals, firms, or corporations.....	\$162, 941. 73
Value of work done by citizens' organizations.....	55, 318. 16
Value of work done by county commissioners, city councils, boards of health, and other representatives of counties, towns, or municipalities (trucks, labor, convicts, etc.).....	92, 752. 87
Money appropriated by counties or municipalities.....	39, 418. 23
Cost of issuing permits, including value of volunteer service.....	13, 309. 12
Total.....	363, 740. 11

No information is available as to the value of such contributions to the eradication campaign subsequent to July 1, 1929.

OTHER ITEMS

Certain loss claims received were clearly outside the scope of the Board's investigation. These claims included items such as damage to business, losses to dealers because of quarantine regulations, losses in profits, various dealer losses, losses in value of property, excess freight rates, loss of property through foreclosure, the unauthorized use of a packing house by a spray crew, and others.

Several claims also were made to the effect that additional expenses were incurred in clearing land, cleaning up wild host plants, fertilizing, cultivating, and other operations that normally would be considered maintenance work. These items are questionable although they might involve expenditures not planned for a particular year.

There probably are items of producer loss other than those mentioned that merit consideration, but which were not reported to the Mediterranean Fruitfly Board.

SUMMARY OF LOSSES

In summary of the conclusions derived in the preceding sections, the Board estimates that the losses sustained by growers and farmers in the State of Florida resulting from the campaign to eradicate the Mediterranean fruitfly amounted to a total of \$7,184,100. The items comprised with this estimated total loss are as follows:

Citrus fruits.....	\$406, 400	
Noncitrus fruits.....	31, 300	
Vegetables and field crops.....	318, 000	\$755, 700
Spray damage to citrus trees.....		1, 660, 300
Additional pruning costs.....		148, 900
Cost of spraying.....		54, 900
Picking and burying citrus drops and splits.....		1, 062, 300
Sterilization of fruit.....		0
Price losses on citrus:		
Oranges and tangerines.....	\$2, 538, 000	
Grapefruit.....	614, 000	3, 152, 000
Livestock losses.....		0
Other losses (miscellaneous).....		350, 000
Total.....		7, 184, 100

OTHER CONSIDERATIONS

This report has dealt entirely with losses sustained by Florida producers as a result of the eradication campaign. It is not within the

²⁶ Unpublished report dated Dec. 7, 1933, in files of Florida State Plant Board.

duties of the Board as given in the act to evaluate the benefits of the campaign, but there are several points to which attention should be directed.

In the first place, the value of the 1929-30 citrus crop in Florida was exceeded during the 10-year period, 1925-34, in only the 1925-26 and 1927-28 seasons (table 15). Since the value of the 1929-30 citrus crop was so large, it is reasonable to assume that crop injury and price discrimination resulting from the eradication campaign was not drastic for the State as a whole. But the favorable income situation in the State as a whole does not preclude the possibility, of course, of losses having been sustained by many individuals in the eradication area.

TABLE 15.—*Production and "on tree" value of citrus fruits in Florida, 1925-26 to 1934-35*

Year	Oranges		Grapefruit		Oranges and grapefruit, value
	Production ¹	Value ²	Production	Value ³	
	<i>Bores</i>		<i>Bores</i>		
1925-26 -----	10, 044, 000	\$22, 197, 000	7, 660, 000	\$13, 865, 000	\$36, 062, 000
1926-27 -----	11, 512, 000	16, 002, 000	8, 693, 000	9, 910, 000	25, 912, 000
1927-28 -----	9, 487, 000	25, 141, 000	8, 158, 000	16, 561, 000	41, 702, 000
1928-29 -----	15, 588, 000	11, 847, 000	11, 314, 000	9, 391, 000	21, 238, 000
1929-30 -----	10, 304, 000	18, 444, 000	8, 274, 000	14, 810, 000	33, 254, 000
1930-31 -----	19, 211, 000	20, 556, 000	16, 109, 000	8, 377, 000	28, 933, 000
1931-32 -----	14, 220, 000	19, 481, 000	10, 786, 000	7, 658, 000	27, 139, 000
1932-33 -----	16, 200, 000	10, 692, 000	11, 800, 000	4, 720, 000	15, 412, 000
1933-34 -----	18, 100, 000	15, 747, 000	10, 700, 000	6, 955, 000	22, 702, 000
1934-35 -----	17, 600, 000	14, 784, 000	15, 200, 000	5, 472, 000	20, 256, 000

¹ Annual estimates of production include tangerines and satsumas.

² Value obtained by multiplying production data by the "on-tree" average seasonal price of oranges.

³ Value obtained by multiplying production data by "on-tree" average seasonal price.

Source: Bureau of Agricultural Economics.

On the whole, most growers were able to market most of their fruit in each of the crop years when the quarantine was in effect. When the prohibition of shipments went into effect in the spring of 1929, the bulk of the citrus crop had been marketed, and a considerable proportion of the unmarketed crop was being held because of the low level of prices. The number of growers who were unable to market their 1929-30 citrus crop likewise was small. The quarantine regulations were modified, effective September 12, 1929, to permit growers in zones 1 to sterilize and ship their crops. In the early part of October, all but nine of the zones 1 were released from the restrictions applying to such zones, and were permitted to operate under the more liberal regulations applying to the eradication area.

During the fall of 1930, quarantine restrictions affected only the early varieties of fruit, as the quarantine was lifted on November 15, before the main shipping season was well started.

Agriculture is one of the major sources of income in the State of Florida. In 1928, a total gross income estimated at \$125,000,000 was obtained from the sale of agricultural products. Of this amount, nearly \$60,000,000 was derived from crops that were classed as hosts of the Mediterranean fruitfly. Citrus fruits alone accounted for \$40,000,000, or approximately one-third of the total agricultural income.²⁷

The value of Florida citrus groves and equipment in 1928, including the value of packing houses, was estimated at approximately \$330,-

²⁷ Data from unpublished report in files of Florida State Plant Board.

000,000. The cost of handling a Florida citrus crop of 20,000,000 boxes from orchard to market was estimated at between \$40,000,000 and \$45,000,000, excluding costs in terminal markets.²⁷

Values for other host fruits and vegetables in Florida were not computed, but it is known that these represent a substantial investment and annual incomes.

These considerations indicate the tremendous significance of the Mediterranean fruitfly to Florida. While it cannot be assumed that these financial investments and returns would have been wiped out if the Mediterranean fruitfly had not been eradicated, they would no doubt have been greatly curtailed, even though sterilization and other processes might have permitted them to continue.

Other States, including South Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Arizona, and California, would also have been seriously affected had the fly spread to them. Host fruits and vegetables are of considerable importance in each of these States. The average production, value, and carlot shipments of possible host crops in the States believed likely to be most seriously threatened if infested with the Mediterranean fruitfly are shown in table 16. Data for the United States are included in the table for comparison.

TABLE 16.—*Estimated average production, value, and carlot shipments of selected major crops subject to infestation by the Mediterranean fruitfly, 9 States and the United States, 1926-28*

Item	9 States most seriously threatened ¹			United States		
	Production	Value	Carlot shipments	Production	Value	Carlot shipments
	1,000 tons	1,000 dollars	1,000 cars	1,000 tons	1,000 dollars	1,000 cars
Citrus fruits.....	2, 297	150, 732	108	2, 297	150, 732	108
Peaches.....	856	29, 190	34	1, 463	57, 164	52
Pears.....	247	10, 055	11	561	23, 606	23
Plums and prunes.....	² 577	20, 623	3	754	26, 489	7
Cherries.....	19	3, 149	1	198	30, 369	2. 4
Apricots (California only).....	186	10, 565	(³)	186	10, 565	(³)
Figs.....	46	1, 645	(³)	46	1, 645	(³)
Tomatoes.....	466	27, 271	20	1, 771	55, 661	30
Green peppers.....	34	5, 015	2	62	7, 010	3
Eggplant.....	9	554	(³)	13	755	(³)
Grapes.....	2, 307	47, 819	71	2, 563	60, 512	81
Apples.....	314	15, 622	5	4, 185	184, 220	118

¹ The 9 States to which the data pertain are South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Arizona, and California.

² Plums and prunes combined in terms of fresh fruits.

³ Less than 1,000 cars.

Source: Bureau of Agricultural Economics.

Since agriculture is of such tremendous importance in these States subject to injury by the Mediterranean fruitfly, it follows that the welfare of the banks, railroads, and related industries in such States would have been seriously affected had the eradication campaign not been effective. Land values, real estate mortgages, and other investments could have suffered greatly.

It is evident, then, that the eradication campaign was of benefit to the State and nation, even though losses were sustained by many individuals within the eradication area in Florida.

²⁷ Data from unpublished report in files of Florida State Plant Board.

APPENDIX 1

[PUBLIC—No. 535—75TH CONGRESS]

[CHAPTER 260—3D SESSION]

[S. 842]

AN ACT To provide for an investigation and report of losses resulting from the campaign for the eradication of the Mediterranean fruit fly by the Department of Agriculture

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a board is hereby created, to be known as the Mediterranean Fruit Fly Board, to be composed of five individuals to be appointed by the Secretary of Agriculture. Any vacancy occurring in the Board shall be filled in the same manner as the original appointment. Each member of the Board, other than members holding office under the State or Federal Government, shall receive compensation at the rate of \$10 per day while actually employed on the business of the Board. The Board shall cease to exist upon transmitting its report under section 2 of this Act.

SEC. 2. The Board is authorized and directed to conduct a complete investigation and survey of all losses sustained by growers and farmers in the State of Florida resulting from the campaign to eradicate the Mediterranean fruit fly in such State and transmit to the Secretary of Agriculture not later than March 15, 1939, a full report of the results of such investigation and survey: *Provided*, That such report shall serve as information only and shall not be construed as imposing any legal or moral obligation upon the Government of the United States. The Secretary of Agriculture shall, as soon thereafter as practicable, transmit such report of survey to Congress, together with such recommendations as he may, in his judgment, deem advisable.

SEC. 3. With the approval of the Secretary of Agriculture, the Board may (1) without regard to the provisions of other laws applicable to the employment and compensation of officers and employees of the United States employ and fix the compensation and duties of such employees as may be necessary to carry out the purposes of this Act; but the compensation of such employees shall correspond, so far as may be practicable, to the rates established by the Classification Act of 1923, as amended; and may (2) make such expenditures, including expenditures for travel and subsistence expense, for personal services at the seat of government and elsewhere, and for printing and binding, as are necessary for the efficient execution of its functions under this Act.

SEC. 4. That there is hereby authorized to be appropriated the sum of \$10,000, or so much thereof as may be necessary, for the purpose of carrying out the provisions of this Act.

Approved, May 23, 1938.

APPENDIX 2

NOTES ON ESTIMATES OF ACREAGE AND NUMBER OF CITRUS TREES IN ERADICATION AREA, FLORIDA, 1929

Estimates of the acreage and number of citrus trees of various ages and kinds in each of the zones in the eradication area were based in large part upon data prepared by the late Dr. J. E. Turlington, formerly of the University of Florida, who served as statistician for the Florida State Plant Board in 1929.¹ Dr. Turlington's data were used as a basis for separating citrus trees and acreage as between zones 1 and 2 in each county in the eradication area. Since these data were

¹ Dr. Turlington's estimates are contained in an unpublished report in the files of the Florida State Plant Board.

prepared as of July 31, 1929, however, allowance was made for 11 new infestations found subsequent to that date.

The break-down of citrus trees by kinds and ages within zones in each county was based largely upon a citrus-tree survey conducted in 1934 by the Bureau of Agricultural Economics and the Florida Emergency Relief Administration.² Unpublished data from this survey on the average number of various kinds of citrus trees per acre, by counties, also were used in estimating the total acreage in various kinds of citrus.

While the 1934 survey data relate specifically to groves in which fruit is produced for sale, it is believed that they are sufficiently complete to furnish a correct statistical picture of the situation. Survey data were not available for Duval, Citrus, and Bradford Counties, but citrus production in these three counties is relatively unimportant and estimates for them were made on the basis of State totals.

The estimates of citrus acreage and trees in each of the three zones were checked whenever possible against maps prepared by engineers of the Mediterranean fruitfly project.

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929

1. ALACHUA COUNTY

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
	Number	Number	Number	Number	Number	Number	Number	Number
Oranges:								
5 years and less.....			18,800	275	2,500	35	21,300	310
6 to 10 years.....			5,900	85	800	10	6,700	95
11 to 15 years.....			3,200	50	400	5	3,600	55
16 years and older.....			39,400	580	5,300	80	44,700	660
Total.....			67,300	990	9,000	130	76,300	1,120
Tangerines:								
5 years and less.....			3,200	45	400	5	3,600	50
6 to 10 years.....			600	10	100	(²)	700	10
11 to 15 years.....			900	15	100	(²)	1,000	15
16 years and older.....			3,000	45	400	5	3,400	50
Total.....			7,700	115	1,000	10	8,700	125
Grapefruit:								
5 years and less.....			1,400	20	200	5	1,600	25
6 to 10 years.....			300	5	(¹)	(²)	300	5
11 to 15 years.....			200	5	(¹)	(²)	200	5
16 years and older.....			3,100	45	400	5	3,500	50
Total.....			5,000	75	600	10	5,600	85
Total citrus:								
5 years and less.....			23,400	340	3,100	45	26,500	385
6 to 10 years.....			6,800	100	900	10	7,700	110
11 to 15 years.....			4,300	70	500	5	4,800	75
16 years and older.....			45,500	670	6,100	90	51,600	760
Total.....			80,000	1,180	10,600	150	90,600	1,330

2. BRADFORD COUNTY

Oranges:								
5 years and less.....			100	(²)	500	10	600	10
6 to 10 years.....			100	(²)	500	10	600	10
11 to 15 years.....			100	(²)	300	5	400	5
16 years and older.....			100	(²)	400	5	500	5
Total.....			400	(²)	1,700	30	2,100	30

¹ Less than 50 trees.

² Less than 2½ acres.

² S. R. Newell, Florida Citrus Tree Survey, 1935. Bureau of Agricultural Economics, mimeograph.

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

2. BRADFORD COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
Tangerines:								
5 years and less.....	-----	-----	(1)	(2)	100	(2)	100	(2)
6 to 10 years.....	-----	-----	(1)	(2)	100	(2)	100	(2)
11 to 15 years.....	-----	-----	(1)	(1)	(1)	(2)	(1)	(2)
16 years and older.....	-----	-----	(1)	(2)	(1)	(2)	(1)	(2)
Total.....	-----	-----	(1)	(2)	200	(2)	200	(2)
Grapefruit:								
5 years and less.....	-----	-----	(1)	(2)	200	5	200	5
6 to 10 years.....	-----	-----	(1)	(2)	200	5	200	5
11 to 15 years.....	-----	-----	(1)	(2)	200	5	200	5
16 years and older.....	-----	-----	(1)	(2)	100	(2)	100	(2)
Total.....	-----	-----	(1)	(2)	700	15	700	15
Total citrus:								
5 years and less.....	-----	-----	100	(2)	800	15	900	15
6 to 10 years.....	-----	-----	100	(2)	800	15	900	15
11 to 15 years.....	-----	-----	100	(2)	500	10	600	10
16 years and older.....	-----	-----	100	(2)	500	5	600	5
Total.....	-----	-----	400	(2)	2,600	45	3,000	45

3. BREVARD COUNTY

Oranges:								
5 years and less.....	166,200	1,970	29,300	345	-----	-----	195,500	2,315
6 to 10 years.....	153,900	1,825	27,200	320	-----	-----	181,100	2,145
11 to 15 years.....	87,900	1,040	15,500	185	-----	-----	103,400	1,225
16 years and older.....	124,600	1,475	22,000	260	-----	-----	146,600	1,735
Total.....	532,600	6,310	94,000	1,110	-----	-----	626,600	7,420
Tangerines:								
5 years and less.....	15,200	180	2,700	30	-----	-----	17,900	210
6 to 10 years.....	7,700	90	1,400	15	-----	-----	9,100	105
11 to 15 years.....	5,500	65	1,000	10	-----	-----	6,500	75
16 years and older.....	3,800	45	700	10	-----	-----	4,500	55
Total.....	32,200	380	5,800	65	-----	-----	38,000	445
Grapefruit:								
5 years and less.....	59,400	705	10,500	125	-----	-----	69,900	830
6 to 10 years.....	39,300	465	6,900	80	-----	-----	46,200	545
11 to 15 years.....	38,500	455	6,800	80	-----	-----	45,300	535
16 years and older.....	28,700	340	5,100	60	-----	-----	33,800	400
Total.....	165,900	1,965	29,300	345	-----	-----	195,200	2,310
Total citrus:								
5 years and less.....	240,800	2,855	42,500	500	-----	-----	283,300	3,355
6 to 10 years.....	200,900	2,380	35,500	415	-----	-----	236,400	2,795
11 to 15 years.....	131,900	1,560	23,300	275	-----	-----	155,200	1,835
16 years and older.....	157,100	1,860	27,800	330	-----	-----	184,900	2,190
Total.....	730,700	8,655	129,100	1,520	-----	-----	859,800	10,175

4. CITRUS COUNTY

Oranges:								
5 years and less.....	500	10	1,900	35	13,200	235	15,600	280
6 to 10 years.....	(1)	(2)	200	5	1,200	20	1,400	25
11 to 15 years.....	100	(2)	200	5	1,600	30	1,900	35
16 years and older.....	200	5	800	15	5,600	100	6,600	120
Total.....	800	15	3,100	60	21,600	385	25,500	460

¹Less than 50 trees.²Less than 2½ acres.

40 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

4. CITRUS COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
	Number	Number (2)	Number	Number	Number	Number	Number	Number
Tangerines:								
5 years and less.....	100	(2)	300	5	2,300	40	2,700	
6 to 10 years.....			(1)	(2)	(1)	(2)	(1)	(2)
11 to 15 years.....			(1)	(2)	(1)	(2)	(1)	(2)
16 years and older.....			(1)	(2)	(1)	(2)	(1)	(2)
Total.....	100	(2)	300	5	2,300	40	2,700	45
Grapefruit:								
5 years and less.....	100	(2)	200	5	1,600	30	1,900	35
6 to 10 years.....	(1)	(2)	(1)	(2)	200	5	200	5
11 to 15 years.....	(1)	(2)	(1)	(2)	300	5	300	5
16 years and older.....	(1)	(2)	(1)	(2)	300	5	300	5
Total.....	100	(2)	200	5	2,400	45	2,700	50
Total citrus:								
5 years and less.....	700	10	2,400	45	17,100	305	20,200	360
6 to 10 years.....	(1)	(2)	200	5	1,400	25	1,600	30
11 to 15 years.....	100	(2)	200	5	1,900	35	2,200	40
16 years and older.....	200	5	800	15	5,900	105	6,900	125
Total.....	1,000	15	3,600	70	26,300	470	30,900	555

5. CLAY COUNTY

Oranges:								
5 years and less.....			500	10	1,000	15	1,500	25
6 to 10 years.....			500	5	1,000	15	1,500	20
11 to 15 years.....			300	5	500	10	800	15
16 years and older.....			300	5	700	10	1,000	15
Total.....			1,600	25	3,200	50	4,800	75
Tangerines:								
5 years and less.....			100	5	200	5	300	10
6 to 10 years.....			100	(2)	100	(2)	200	(2)
11 to 15 years.....			(1)	(2)	100	(2)	100	(2)
16 years and older.....			(1)	(2)	(1)	(2)	(1)	(2)
Total.....			200	5	400	5	600	10
Grapefruit:								
5 years and less.....			200	(2)	300	5	500	10
6 to 10 years.....			200	5	400	5	600	10
11 to 15 years.....			200	5	400	5	600	10
16 years and older.....			100	(2)	300	5	400	5
Total.....			700	10	1,400	20	2,100	35
Total citrus:								
5 years and less.....			800	15	1,500	25	2,300	45
6 to 10 years.....			800	10	1,500	20	2,300	30
11 to 15 years.....			500	10	1,000	15	1,500	25
16 years and older.....			400	5	1,000	15	1,400	20
Total.....			2,500	40	5,000	75	7,500	120

6. DUVAL COUNTY

Oranges:								
5 years and less.....	200	5	2,300	35	1,100	20	3,600	60
6 to 10 years.....	200	5	2,100	30	1,000	15	3,300	50
11 to 15 years.....	100	(2)	1,200	20	600	10	1,900	30
16 years and older.....	100	(2)	1,600	25	700	10	2,400	35
Total.....	600	10	7,200	110	3,400	55	11,200	175

¹ Less than 50 trees.

² Less than 2½ acres.

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

6. DUVAL COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	100	(²)	400	5	200	5	700	10
6 to 10 years.....	(¹)	(²)	300	5	100	(²)	400	5
11 to 15 years.....	(¹)	(²)	100	(²)	100	(²)	200	(²)
16 years and older.....	(¹)	(²)	100	5	(¹)	(²)	100	5
Total.....	100	(²)	900	15	400	5	1,400	20
Grapefruit:								
5 years and less.....	(¹)	(²)	800	10	400	5	1,200	15
6 to 10 years.....	100	(²)	800	15	400	5	1,300	20
11 to 15 years.....	100	5	800	15	400	5	1,300	25
16 years and older.....	(¹)	(²)	600	10	300	5	900	15
Total.....	200	5	3,000	50	1,500	20	4,700	75
Total citrus:								
5 years and less.....	300	5	3,500	50	1,700	30	5,500	85
6 to 10 years.....	300	5	3,200	50	1,500	20	5,000	75
11 to 15 years.....	200	5	2,100	35	1,100	15	3,400	55
16 years and older.....	100	(²)	2,300	40	1,000	15	3,400	55
Total.....	900	15	11,100	175	5,300	80	17,300	270

7. FLAGLER COUNTY

Oranges:								
5 years and less.....	1,000	15	5,800	75	-----	-----	6,800	90
6 to 10 years.....	900	10	4,900	65	-----	-----	5,800	75
11 to 15 years.....	200	5	1,300	20	-----	-----	1,500	25
16 years and older.....	500	5	2,600	35	-----	-----	3,100	40
Total.....	2,600	35	14,600	195	-----	-----	17,200	230
Tangerines:								
5 years and less.....	600	10	3,300	45	-----	-----	3,900	55
6 to 10 years.....	1,000	15	5,500	75	-----	-----	6,500	90
11 to 15 years.....	(¹)	(²)	(¹)	(²)	-----	-----	(¹)	(²)
16 years and older.....	100	(²)	700	10	-----	-----	800	10
Total.....	1,700	25	9,500	130	-----	-----	11,200	155
Grapefruit:								
5 years and less.....	100	(²)	400	5	-----	-----	500	5
6 to 10 years.....	(¹)	(²)	300	5	-----	-----	300	5
11 to 15 years.....	(¹)	(²)	100	(²)	-----	-----	100	(²)
16 years and older.....	100	(²)	300	5	-----	-----	400	5
Total.....	200	(²)	1,100	15	-----	-----	1,300	15
Total citrus:								
5 years and less.....	1,700	25	9,500	125	-----	-----	11,200	150
6 to 10 years.....	1,900	25	10,700	145	-----	-----	12,600	170
11 to 15 years.....	200	5	1,400	20	-----	-----	1,600	25
16 years and older.....	700	5	3,600	50	-----	-----	4,300	55
Total.....	4,500	60	25,200	340	-----	-----	29,700	400

8. HERNANDO COUNTY

Oranges:								
5 years and less.....	3,700	60	13,700	230	3,000	50	20,400	340
6 to 10 years.....	2,200	40	8,400	145	1,900	30	12,500	215
11 to 15 years.....	1,500	25	5,700	95	1,200	20	8,400	140
16 years and older.....	2,300	40	8,600	145	1,900	35	12,800	220
Total.....	9,700	165	36,400	615	8,000	135	54,100	915

¹ Less than 50 trees.

² Less than 2½ acres.

42 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

8. HERNANDO COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	5,500	95	20,800	350	4,600	75	30,900	520
6 to 10 years.....	3,000	50	11,000	185	2,400	40	16,400	275
11 to 15 years.....	1,000	15	3,800	65	800	15	5,600	95
16 years and older.....	700	10	2,500	45	600	10	3,800	65
Total.....	10,200	170	38,100	645	8,400	140	56,700	955
Grapefruit:								
5 years and less.....	700	10	2,700	45	600	10	4,000	65
6 to 10 years.....	1,000	20	3,900	70	900	15	5,800	105
11 to 15 years.....	1,200	20	4,500	75	1,000	20	6,700	115
16 years and older.....	1,200	20	4,400	75	900	15	6,500	110
Total.....	4,100	70	15,500	265	3,400	60	23,000	395
Total citrus:								
5 years and less.....	9,900	165	37,200	625	8,200	135	55,300	925
6 to 10 years.....	6,200	110	23,300	400	5,200	85	34,700	595
11 to 15 years.....	3,700	60	14,000	235	3,000	55	20,700	350
16 years and older.....	4,200	70	15,500	265	3,400	60	23,100	395
Total.....	24,000	405	90,000	1,525	19,800	335	133,800	2,265

9. HILLSBOROUGH COUNTY

Oranges:								
5 years and less.....	65,300	1,035	236,800	3,755	15,300	240	317,400	5,030
6 to 10 years.....	90,000	1,425	326,400	5,170	21,100	335	437,500	6,930
11 to 15 years.....	26,800	425	97,400	1,545	6,300	100	130,500	2,070
16 years and older.....	32,600	515	118,400	1,875	7,600	120	158,600	2,510
Total.....	214,700	3,400	779,000	12,345	50,300	795	1,044,000	16,540
Tangerines:								
5 years and less.....	7,500	120	27,200	430	1,800	30	36,500	580
6 to 10 years.....	9,700	155	35,400	560	2,300	35	47,400	750
11 to 15 years.....	1,200	20	4,300	70	300	5	5,800	95
16 years and older.....	800	10	2,900	45	200	5	3,900	60
Total.....	19,200	305	69,800	1,105	4,600	75	93,600	1,485
Grapefruit:								
5 years and less.....	14,300	225	51,800	820	3,300	55	69,400	1,100
6 to 10 years.....	22,600	355	81,900	1,300	5,300	85	109,800	1,740
11 to 15 years.....	9,300	150	33,700	535	2,200	35	45,200	720
16 years and older.....	6,900	110	25,300	400	1,600	25	33,800	535
Total.....	53,100	840	192,700	3,055	12,400	200	258,200	4,095
Total citrus:								
5 years and less.....	87,100	1,380	315,800	5,005	20,400	325	423,300	6,710
6 to 10 years.....	122,300	1,935	443,700	7,030	28,700	455	594,700	9,420
11 to 15 years.....	37,300	595	135,400	2,150	8,800	140	181,500	2,885
16 years and older.....	40,300	635	146,600	2,320	9,400	150	196,300	3,105
Total.....	287,000	4,545	1,041,500	16,505	67,300	1,070	1,395,800	22,120

10. LAKE COUNTY

Oranges:								
5 years and less.....	144,800	2,520	267,400	4,650	-----	-----	412,200	7,170
6 to 10 years.....	97,500	1,695	180,100	3,130	-----	-----	277,600	4,825
11 to 15 years.....	38,800	675	71,800	1,250	-----	-----	110,600	1,925
16 years and older.....	85,400	1,485	157,700	2,745	-----	-----	243,100	4,230
Total.....	366,500	6,375	677,000	11,775	-----	-----	1,043,500	18,150

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

10. LAKE COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	24,500	425	45,200	785	-----	-----	69,700	1,210
6 to 10 years.....	17,400	305	32,300	560	-----	-----	49,700	865
11 to 15 years.....	4,300	75	7,900	135	-----	-----	12,200	210
16 years and older.....	4,700	80	8,700	150	-----	-----	13,400	230
Total.....	50,900	885	94,100	1,630	-----	-----	145,000	2,515
Grapefruit:								
5 years and less.....	59,600	1,035	110,000	1,915	-----	-----	169,600	2,950
6 to 10 years.....	43,900	765	81,100	1,410	-----	-----	125,000	2,175
11 to 15 years.....	19,600	340	36,200	630	-----	-----	55,800	970
16 years and older.....	19,000	330	35,200	610	-----	-----	54,200	940
Total.....	142,100	2,470	262,500	4,565	-----	-----	404,600	7,035
Total citrus:								
5 years and less.....	228,900	3,980	422,600	7,350	-----	-----	651,500	11,330
6 to 10 years.....	158,800	2,765	293,500	5,100	-----	-----	452,300	7,865
11 to 15 years.....	62,700	1,090	115,900	2,015	-----	-----	178,600	3,105
16 years and older.....	109,100	1,895	201,600	3,505	-----	-----	310,700	5,400
Total.....	559,500	9,730	1,033,600	17,970	-----	-----	1,593,100	27,700

11. LEVY COUNTY

Oranges:								
5 years and less.....	100	(2)	100	(2)	(1)	(2)	200	(2)
6 to 10 years.....	900	15	700	15	300	5	1,900	35
11 to 15 years.....	200	5	100	(2)	(1)	(2)	300	5
16 years and older.....	400	10	300	5	100	(2)	800	15
Total.....	1,600	30	1,200	20	400	5	3,200	55
Tangerines:								
5 years and less.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
6 to 10 years.....	-----	-----	-----	-----	-----	-----	-----	-----
11 to 15 years.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
16 years and older.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Total.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Grapefruit:								
5 years and less.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
6 to 10 years.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
11 to 15 years.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
16 years and older.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Total.....	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Total citrus:								
5 years and less.....	100	(2)	100	(2)	(1)	(2)	200	(2)
6 to 10 years.....	900	15	700	15	300	5	1,900	35
11 to 15 years.....	200	5	100	(2)	(1)	(2)	300	5
16 years and older.....	400	10	300	5	100	(2)	800	15
Total.....	1,600	30	1,200	20	400	5	3,200	55

12. MARION COUNTY

Oranges:								
5 years and less.....	20,200	310	164,200	2,500	20,500	310	204,900	3,120
6 to 10 years.....	8,700	135	71,200	1,085	8,900	135	88,800	1,355
11 to 15 years.....	3,800	55	30,700	470	3,800	60	38,300	585
16 years and older.....	15,100	230	123,000	1,875	15,300	235	153,400	2,340
Total.....	47,800	730	389,100	5,930	48,500	740	485,400	7,400

¹ Less than 50 trees.² Less than 2½ acres.

44 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

12. MARION COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	2,200	35	17,700	270	2,200	35	22,100	340
6 to 10 years.....	1,300	20	10,500	160	1,300	20	13,100	200
11 to 15 years.....	100	(2)	1,000	15	100	(2)	1,200	15
16 years and older.....	900	15	7,800	120	1,000	15	9,700	150
Total.....	4,500	70	37,000	565	4,600	70	46,100	705
Grapefruit:								
5 years and less.....	1,300	20	10,200	155	1,300	20	12,800	195
6 to 10 years.....	1,300	20	10,800	165	1,300	20	13,400	205
11 to 15 years.....	900	15	7,600	115	900	15	9,400	145
16 years and older.....	1,600	25	13,000	200	1,600	25	16,200	250
Total.....	5,100	80	41,600	635	5,100	80	51,800	795
Total citrus:								
5 years and less.....	23,700	365	192,100	2,925	24,000	365	239,800	3,655
6 to 10 years.....	11,300	175	92,500	1,410	11,500	175	115,300	1,760
11 to 15 years.....	4,800	70	39,300	600	4,800	75	48,900	745
16 years and older.....	17,600	270	143,800	2,195	17,900	275	179,300	2,740
Total.....	57,400	880	467,700	7,130	58,200	890	583,300	8,900

13. ORANGE COUNTY

Oranges:								
5 years and less.....	561,200	8,390	62,100	930	-----	-----	623,300	9,320
6 to 10 years.....	419,000	6,260	46,400	695	-----	-----	465,400	6,955
11 to 15 years.....	221,100	3,305	24,500	365	-----	-----	245,600	3,670
16 years and older.....	344,800	5,155	38,200	570	-----	-----	383,000	5,725
Total.....	1,546,100	23,110	171,200	2,560	-----	-----	1,717,300	25,670
Tangerines:								
5 years and less.....	109,100	1,630	12,100	180	-----	-----	121,200	1,810
6 to 10 years.....	73,300	1,095	8,100	120	-----	-----	81,400	1,215
11 to 15 years.....	14,600	220	1,600	25	-----	-----	16,200	245
16 years and older.....	14,800	220	1,700	25	-----	-----	16,500	245
Total.....	211,800	3,165	23,500	350	-----	-----	235,300	3,515
Grapefruit:								
5 years and less.....	48,100	720	5,300	80	-----	-----	53,400	800
6 to 10 years.....	55,000	820	6,100	90	-----	-----	61,100	910
11 to 15 years.....	57,400	855	6,400	95	-----	-----	63,800	950
16 years and older.....	61,200	915	6,800	100	-----	-----	68,000	1,015
Total.....	221,700	3,310	24,600	365	-----	-----	246,300	3,675
Total citrus:								
5 years and less.....	718,400	10,740	79,500	1,190	-----	-----	797,900	11,930
6 to 10 years.....	547,300	8,175	60,600	905	-----	-----	607,900	9,080
11 to 15 years.....	293,100	4,380	32,500	485	-----	-----	325,600	4,865
16 years and older.....	420,800	6,290	46,700	685	-----	-----	467,500	6,985
Total.....	1,979,600	29,585	219,300	3,275	-----	-----	2,198,900	32,860

14. OSCEOLA COUNTY

Oranges:								
5 years and less.....	14,100	235	40,000	670	2,300	40	56,400	945
6 to 10 years.....	9,900	165	28,100	470	1,600	30	39,600	665
11 to 15 years.....	13,300	225	37,600	630	2,200	35	53,100	890
16 years and older.....	7,200	120	20,500	345	1,200	20	28,900	485
Total.....	44,500	745	126,200	2,115	7,300	125	178,000	2,985

¹ Less than 2½ acres.

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

14. OSCEOLA COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	3,100	50	8,800	145	500	10	12,400	205
6 to 10 years.....	3,600	60	10,300	170	600	10	14,500	240
11 to 15 years.....	800	15	2,300	40	100	(?)	3,200	55
16 years and older.....	700	15	2,000	35	100	(?)	2,800	50
Total.....	8,200	140	23,400	390	1,300	20	32,900	550
Grapefruit:								
5 years and less.....	1,100	20	3,100	55	200	5	4,400	80
6 to 10 years.....	2,300	40	6,600	110	400	5	9,300	155
11 to 15 years.....	5,200	85	14,700	245	900	15	20,800	345
16 years and older.....	3,000	50	8,600	145	500	10	12,100	205
Total.....	11,600	195	33,000	555	2,000	35	46,600	785
Total citrus:								
5 years and less.....	18,300	305	51,900	870	3,000	55	73,200	1,230
6 to 10 years.....	15,800	265	45,000	750	2,600	45	63,400	1,060
11 to 15 years.....	19,300	325	54,600	915	3,200	50	77,100	1,290
16 years and older.....	10,900	185	31,100	525	1,800	30	43,800	740
Total.....	64,300	1,080	182,600	3,060	10,600	180	257,500	4,320

15. PASCO COUNTY

Oranges:								
5 years and less.....	10,500	170	85,400	1,380	16,300	265	112,200	1,815
6 to 10 years.....	6,400	105	51,600	835	9,900	160	67,900	1,100
11 to 15 years.....	3,700	60	29,800	480	5,700	90	39,200	630
16 years and older.....	3,400	55	27,800	450	5,300	85	36,500	590
Total.....	24,000	390	194,600	3,145	37,200	600	255,800	4,135
Tangerines:								
5 years and less.....	1,900	30	15,700	255	3,000	50	20,600	335
6 to 10 years.....	1,000	15	8,100	130	1,600	25	10,700	170
11 to 15 years.....	200	5	1,500	25	300	5	2,000	35
16 years and older.....	100	(?)	1,000	15	200	5	1,300	20
Total.....	3,200	50	26,300	425	5,100	85	34,600	560
Grapefruit:								
5 years and less.....	2,100	35	16,900	270	3,200	50	22,200	355
6 to 10 years.....	1,500	25	12,100	195	2,300	35	15,900	255
11 to 15 years.....	3,000	50	24,700	400	4,700	75	32,400	525
16 years and older.....	700	10	5,400	90	1,000	15	7,100	115
Total.....	7,300	120	59,100	955	11,200	175	77,600	1,250
Total citrus:								
5 years and less.....	14,500	235	118,000	1,905	22,500	365	155,000	2,505
6 to 10 years.....	8,900	145	71,800	1,160	13,800	220	94,500	1,525
11 to 15 years.....	6,900	115	56,000	905	10,700	170	73,600	1,190
16 years and older.....	4,200	65	34,200	555	6,500	105	44,900	725
Total.....	34,500	560	280,000	4,525	53,500	860	368,000	5,945

16. PINELLAS COUNTY

Oranges:								
5 years and less.....	31,400	500	50,500	800	-----	-----	81,900	1,300
6 to 10 years.....	43,000	680	69,200	1,100	-----	-----	112,200	1,780
11 to 15 years.....	39,000	620	62,700	995	-----	-----	101,700	1,615
16 years and older.....	35,400	560	57,000	905	-----	-----	92,400	1,465
Total.....	148,800	2,360	239,400	3,800	-----	-----	388,200	6,160

¹ Less than 2½ acres.

46 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

16. PINELLAS COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	5,000	80	8,100	130	-----	-----	13,100	210
6 to 10 years.....	6,500	105	10,400	165	-----	-----	16,900	270
11 to 15 years.....	2,600	40	4,200	65	-----	-----	6,800	105
16 years and older.....	2,000	30	3,200	50	-----	-----	5,200	80
Total.....	16,100	255	25,900	410	-----	-----	42,000	665
Grapefruit:								
5 years and less.....	35,700	565	57,500	915	-----	-----	93,200	1,480
6 to 10 years.....	35,700	570	57,500	915	-----	-----	93,200	1,485
11 to 15 years.....	53,500	850	86,100	1,365	-----	-----	139,600	2,215
16 years and older.....	60,200	955	96,900	1,535	-----	-----	157,100	2,490
Total.....	185,100	2,940	298,000	4,730	-----	-----	483,100	7,670
Total citrus:								
5 years and less.....	72,100	1,145	116,100	1,845	-----	-----	188,200	2,990
6 to 10 years.....	85,200	1,355	137,100	2,180	-----	-----	222,300	3,535
11 to 15 years.....	95,100	1,510	153,000	2,425	-----	-----	248,100	3,935
16 years and older.....	97,600	1,545	157,100	2,490	-----	-----	254,700	4,035
Total.....	350,000	5,555	563,300	8,940	-----	-----	913,300	14,495

17. POLK COUNTY

Oranges:								
5 years and less.....	112,100	1,865	645,900	10,745	-----	-----	758,000	12,610
6 to 10 years.....	160,000	2,660	921,600	15,335	-----	-----	1,081,600	17,995
11 to 15 years.....	82,600	1,375	476,100	7,925	-----	-----	558,700	9,300
16 years and older.....	54,400	905	313,500	5,215	-----	-----	367,900	6,120
Total.....	409,100	6,805	2,357,100	39,220	-----	-----	2,766,200	46,025
Tangerines:								
5 years and less.....	17,600	295	101,300	1,690	-----	-----	118,900	1,985
6 to 10 years.....	21,100	350	121,700	2,030	-----	-----	142,800	2,380
11 to 15 years.....	8,100	135	46,600	775	-----	-----	54,700	910
16 years and older.....	3,100	50	18,100	300	-----	-----	21,200	350
Total.....	49,900	830	287,700	4,795	-----	-----	337,600	5,625
Grapefruit:								
5 years and less.....	48,200	805	277,500	4,625	-----	-----	325,700	5,430
6 to 10 years.....	75,800	1,265	437,000	7,285	-----	-----	512,800	8,550
11 to 15 years.....	68,200	1,135	392,900	6,550	-----	-----	461,100	7,685
16 years and older.....	32,900	545	189,400	3,155	-----	-----	222,300	3,700
Total.....	225,100	3,750	1,296,800	21,615	-----	-----	1,521,900	25,365
Total citrus:								
5 years and less.....	177,900	2,965	1,024,700	17,060	-----	-----	1,202,600	20,025
6 to 10 years.....	256,900	4,275	1,480,300	24,650	-----	-----	1,737,200	28,925
11 to 15 years.....	158,900	2,645	915,600	15,250	-----	-----	1,074,500	17,895
16 years and older.....	90,400	1,500	521,000	8,670	-----	-----	611,400	10,170
Total.....	684,100	11,385	3,941,600	65,630	-----	-----	4,625,700	77,015

18. PUTNAM COUNTY

Oranges:								
5 years and less.....	29,200	390	26,600	355	-----	-----	55,800	745
6 to 10 years.....	8,400	110	7,700	100	-----	-----	16,100	210
11 to 15 years.....	12,000	160	11,000	145	-----	-----	23,000	305
16 years and older.....	103,100	1,370	94,200	1,250	-----	-----	197,300	2,620
Total.....	152,700	2,030	139,500	1,850	-----	-----	292,200	3,880

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

18. PUTMAN COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	8,000	105	7,300	95	-----	-----	15,300	200
6 to 10 years.....	1,500	20	1,400	20	-----	-----	2,900	40
11 to 15 years.....	2,000	25	1,800	25	-----	-----	3,800	50
16 years and older.....	14,500	195	13,300	175	-----	-----	27,800	370
Total.....	26,000	345	23,800	315	-----	-----	49,800	660
Grapefruit:								
5 years and less.....	2,100	30	2,000	25	-----	-----	4,100	55
6 to 10 years.....	400	5	400	5	-----	-----	800	10
11 to 15 years.....	1,000	10	900	10	-----	-----	1,900	20
16 years and older.....	13,500	180	12,300	165	-----	-----	25,800	345
Total.....	17,000	225	15,600	205	-----	-----	32,600	430
Total citrus:								
5 years and less.....	39,300	525	35,900	475	-----	-----	75,200	1,000
6 to 10 years.....	10,300	135	9,500	125	-----	-----	19,800	260
11 to 15 years.....	15,000	195	13,700	180	-----	-----	28,700	375
16 years and older.....	131,100	1,745	119,800	1,590	-----	-----	250,900	3,335
Total.....	195,700	2,600	178,900	2,370	-----	-----	374,600	4,970

19. ST. JOHNS COUNTY

Oranges:								
5 years and less.....	5,900	85	7,600	110	-----	-----	13,500	195
6 to 10 years.....	800	10	1,100	15	-----	-----	1,900	25
11 to 15 years.....	3,200	45	4,100	60	-----	-----	7,300	105
16 years and older.....	5,300	75	6,700	95	-----	-----	12,000	170
Total.....	15,200	215	19,500	280	-----	-----	34,700	495
Tangerines:								
5 years and less.....	100	(²)	100	(²)	-----	-----	200	(²)
6 to 10 years.....	(¹)	(²)	100	(²)	-----	-----	100	(²)
11 to 15 years.....	-----	-----	-----	-----	-----	-----	-----	-----
16 years and older.....	500	10	600	10	-----	-----	1,100	20
Total.....	600	10	800	10	-----	-----	1,400	20
Grapefruit:								
5 years and less.....	600	5	700	10	-----	-----	1,300	15
6 to 10 years.....	100	(²)	100	(²)	-----	-----	200	(²)
11 to 15 years.....	500	10	700	10	-----	-----	1,200	20
16 years and older.....	300	5	400	5	-----	-----	700	10
Total.....	1,500	20	1,900	25	-----	-----	3,400	45
Total citrus:								
5 years and less.....	6,600	90	8,400	120	-----	-----	15,000	210
6 to 10 years.....	900	10	1,300	15	-----	-----	2,200	25
11 to 15 years.....	3,700	55	4,800	70	-----	-----	8,500	125
16 years and older.....	6,100	90	7,700	110	-----	-----	13,800	200
Total.....	17,300	245	22,200	315	-----	-----	39,500	560

20. SEMINOLE COUNTY

Oranges:								
5 years and less.....	89,900	1,315	10,400	150	-----	-----	100,300	1,465
6 to 10 years.....	50,500	740	5,800	85	-----	-----	56,300	825
11 to 15 years.....	22,400	325	2,600	40	-----	-----	25,000	365
16 years and older.....	113,100	1,660	13,000	190	-----	-----	126,100	1,850
Total.....	275,900	4,040	31,800	465	-----	-----	307,700	4,505

¹ Less than 50 trees.² Less than 2½ acres.

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

20. SEMINOLE COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	25,400	365	2,900	40	-----	-----	28,300	405
6 to 10 years.....	11,800	170	1,400	20	-----	-----	13,200	190
11 to 15 years.....	7,400	105	900	15	-----	-----	8,300	120
16 years and older.....	7,100	100	800	10	-----	-----	7,900	110
Total.....	51,700	740	6,000	85	-----	-----	57,700	825
Grapefruit:								
5 years and less.....	13,100	190	1,500	20	-----	-----	14,600	210
6 to 10 years.....	5,700	85	600	10	-----	-----	6,300	95
11 to 15 years.....	5,000	75	600	10	-----	-----	5,600	85
16 years and older.....	15,500	225	1,800	25	-----	-----	17,300	250
Total.....	39,300	575	4,500	65	-----	-----	43,800	640
Total citrus:								
5 years and less.....	128,400	1,870	14,800	210	-----	-----	143,200	2,080
6 to 10 years.....	68,000	995	7,800	115	-----	-----	75,800	1,110
11 to 15 years.....	34,800	505	4,100	65	-----	-----	38,900	570
16 years and older.....	135,700	1,985	15,600	225	-----	-----	151,300	2,210
Total.....	366,900	5,355	42,300	615	-----	-----	409,200	5,970

21. SUMTER COUNTY

Oranges:								
5 years and less.....	300	5	8,600	120	5,900	85	14,800	210
6 to 10 years.....	200	5	5,900	85	4,100	60	10,200	150
11 to 15 years.....	500	5	12,700	185	8,800	125	22,000	315
16 years and older.....	1,300	20	38,200	550	26,400	380	65,900	950
Total.....	2,300	35	65,400	940	45,200	650	112,900	1,625
Tangerines:								
5 years and less.....	(1)	(2)	300	5	200	5	500	10
6 to 10 years.....	(1)	(2)	1,000	15	700	10	1,700	25
11 to 15 years.....	(1)	(2)	500	5	400	5	900	10
16 years and older.....	100	(2)	2,000	30	1,400	20	3,500	50
Total.....	100	(2)	3,800	55	2,700	40	6,600	95
Grapefruit:								
5 years and less.....	(1)	(2)	300	5	200	5	500	10
6 to 10 years.....	(1)	(2)	300	5	200	5	500	10
11 to 15 years.....	100	(2)	1,300	20	900	15	2,300	35
16 years and older.....	100	5	4,100	60	2,800	40	7,000	105
Total.....	200	5	6,000	90	4,100	65	10,300	160
Total citrus:								
5 years and less.....	300	5	9,200	130	6,300	95	15,800	230
6 to 10 years.....	200	5	7,200	105	5,000	75	12,400	185
11 to 15 years.....	600	5	14,500	210	10,100	145	25,200	360
16 years and older.....	1,500	25	44,300	640	30,600	440	76,400	1,105
Total.....	2,600	40	75,200	1,085	52,000	755	129,800	1,880

22. VOLUSIA COUNTY

Oranges:								
15 years and less.....	137,400	2,000	58,900	855	-----	-----	196,300	2,855
6 to 10 years.....	76,600	1,115	32,800	480	-----	-----	109,400	1,595
11 to 15 years.....	57,900	845	24,800	360	-----	-----	82,700	1,205
16 years and older.....	206,800	3,010	88,600	1,290	-----	-----	295,400	4,300
Total.....	478,700	6,970	205,100	2,985	-----	-----	683,800	9,955

¹ Less than 50 trees.² Less than 2½ acres.

Citrus trees and acreage, by zones, kinds of citrus, and acres of trees in the eradication area, by counties, Florida, 1929—Continued

22. VOLUSIA COUNTY—Continued

Item	Zone 1		Zone 2		Zone 3		Total for county within eradication area	
	Trees	Acres	Trees	Acres	Trees	Acres	Trees	Acres
Tangerines:	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>	<i>Number</i>
5 years and less.....	53,400	780	22,900	335	-----	-----	76,300	1,115
6 to 10 years.....	34,700	505	14,900	215	-----	-----	49,600	720
11 to 15 years.....	9,800	140	4,200	60	-----	-----	14,000	200
16 years and older.....	28,700	420	12,300	180	-----	-----	41,000	600
Total.....	126,600	1,845	54,300	790	-----	-----	180,900	2,635
Grapefruit:								
5 years and less.....	12,400	180	5,300	80	-----	-----	17,700	260
6 to 10 years.....	9,700	140	4,200	60	-----	-----	13,900	200
11 to 15 years.....	8,900	130	3,800	55	-----	-----	12,700	185
16 years and older.....	26,700	390	11,400	165	-----	-----	38,100	555
Total.....	57,700	840	24,700	360	-----	-----	82,400	1,200
Total citrus:								
5 years and less.....	203,200	2,960	87,100	1,270	-----	-----	290,300	4,230
6 to 10 years.....	121,000	1,760	51,900	755	-----	-----	172,900	2,515
11 to 15 years.....	76,600	1,115	32,800	475	-----	-----	109,400	1,590
16 years and older.....	262,200	3,820	112,300	1,635	-----	-----	374,500	5,455
Total.....	663,000	9,655	284,100	4,135	-----	-----	947,100	13,790

APPENDIX 3

Differences in regulations and requirements for the eradication and barrier areas

ERADICATION AREA ¹BARRIER AREA ²

Host-free period—citrus fruits required
April 15 to September 1:
P. Q. C. A. Adm. Inst. 269.
Revising Reg. 3 A (1).

Host-free period—citrus fruits required
April 15 to Oct. 1:
S. P. B. 42 C (1).

Host-free period—noncitrus fruits required April 15 to Sept. 1:
P. Q. C. A. Adm. Inst. 269.
Revising Reg. 3 A (1).

Host-free period—noncitrus fruits required April 15 to Oct. 1:
S. P. B. Rule 42 C (1).

Host-free period—host vegetables and cantaloupes required June 15 to Sept. 1:
P. Q. C. A. Adm. Inst. 269.
Revising Reg. 3 A (1).

Host-free period—host vegetables required June 15 to Oct. 1:
S. P. B. Rule 42 C (1).

Host-free period (harvesting and clean-up commercial citrus plantings required):
P. Q. C. A. Adm. Inst. 269.
Revising Reg. 3 B (2).

State-wide citrus clean-up of all citrus fruits outside Eradication Area required April 15.
S. P. B. Rule 42 V.

Host-free period—noncitrus fruits not required.

Host-free period—host vegetables not required.

¹ The geographic location and limits of the eradication area are indicated in figure 1 [facing p. 3 in this document].

² The barrier area comprised the portion of Florida lying east and south of the Ocklockonee River, and outside of the eradication area.

Differences in regulations and requirements for the eradication and barrier areas—
Continued

ERADICATION AREA—continued

Host vegetables may not be planted or grown which will mature or reach a stage susceptible to infestation during host-free period:

S. P. B. Rule 42 C (3).

Elimination of summer fruiting host plants required:

Regulation 3 A (2).

S. P. B. Rule 42 C (4).

Spraying and clean-up for host fruits, spraying to kill adult flies, weekly pick-up of drops and burying 3 feet deep required:

P. Q. C. A. Adm. Inst. 2050.

Revising Reg. 3 A (3) (a).

S. P. B. Rule 42 D (1) (a).

Clean-up for host vegetables at weekly intervals for ripening vegetables and drops:

Reg. 3 A (3) (b).

S. P. B. Rule 42 D (1) (b).

Spraying and clean-up on other than commercial properties. Improved properties to include enforcement of requirements under Reg. 3 A (3).

Host plants, wild and cultivated, on uncared-for, unimproved, and wild lands, areas bordering public highways, etc., to be destroyed:

Reg. 3 A (4).

S. P. B. Rule 42 E (1) (2).

Host fruits—sterilized to Southern and Midwestern States from Nov. 21 to Feb. 28.

Unsterilized only to North and East of Potomac Yards:

P. Q. C. A. Adm. Inst. 254 and 262.

Modified Reg. 3 A (5).

Host vegetables: All host vegetables may go North and East Potomac Yards. Green tomatoes and eggplants only to Midwestern area.

No host vegetables to Southern and Western States or West Florida area:

P. Q. C. A. Adm. Inst. 254.

modification of Reg. 3 A (5).

Host fruits and vegetables may not be moved from any property until such property has been inspected and approved and property certificate issued:

S. P. B. Rule 42 N (1).

Seed cotton may move under permit to Barrier Area for ginning:

Reg. 5 (2).

S. P. B. Rule 42 P (3).

Planting of trees the fruit of which is a host (except citrus, palm, grape, avocado, mango, banana, loquat) prohibited:

S. P. B. Rule 42 D (2).

BARRIER AREA—continued

Host vegetables—no date limitation is placed on production.

Elimination of summer-fruiting host plants not required.

Spraying and clean-up for host fruits not required.

Clean-up for host vegetables not required.

Spraying and clean-up on other than commercial properties not required.

Not required.

Host fruits—sterilized to 18 Southern and Western States from Nov. 21 to Feb. 28.

Unsterilized to all but 18 Southern and Western States:

P. W. C. A. Adm. Inst. 254 and 262.

Modified Reg. 3 A (5).

Host vegetables: All host vegetables may go to Northeastern and Midwestern States.

Green tomatoes may go to 18 Southern and Western States and west Florida area:

P. Q. C. A. Adm. Inst. 254.

modification of Reg. 3 A (5).

Host fruits and vegetables may be moved intrastate without property certificate. For delivery to packing, processing or cold storage plants for interstate shipment, property certificate required:

Reg. 4 (8).

Seed cotton may move under permit to West Florida Area and other States for ginning:

S. P. B. Rule 42 P (4).

Reg. 5 (3).

Planting of trees the fruit of which is a host not prohibited.

Differences in regulations and requirements for the eradication and barrier areas—
Continued

ERADICATION AREA—continued

Properties on which are produced host fruits and vegetables must be maintained in such condition as to permit on inspection the ready discovery of cull fruits and vegetables:

S. P. B. Rule 42 D (3).

Screening of host fruits and vegetables required of stores, trucks, and other local handling and utilization agencies: S. P. B. Rule 42 H.

Garbage and refuse containing host fruits or host vegetables from residences, hotels, restaurants, etc., required to be kept in tightly closed metal garbage cans and garbage destroyed by burning or burying 3 feet deep. May not be fed to livestock:

S. P. B. Rule 42 J.

Sand, soil, earth, peat, compost, and manure shall not move interstate to any point outside thereof:

Reg. 6 (1).

S. P. B. Rule 42 Q.

Nursery stock: May move under permit if nursery is situated or protected to eliminate risk of soil infestation, or so treated or cleaned as to eliminate any danger of carrying Mediterranean fruitfly:

Reg. 8 (a) (b).

S. P. B. Rule 42 P.

On all abandoned and uncared-for properties the plants or fruit trees thereon capable of bearing host fruits must be destroyed:

S. P. B. Rule 24.

Source: Florida State Plant Board.

BARRIER AREA—continued

No regulations on maintenance of property.

Screening of host fruits and vegetables not required except canning and processing plants.

Garbage and refuse containing host fruits or host vegetables not regulated. May be fed to livestock.

Sand, soil, earth, peat, compost, and manure, no restrictions on interstate movement:

Reg. 6 (2) (Prohibited to West Florida area).

S. P. B. Rule 42 Q.

Nursery stock: May move under permit when originating outside eradication area:

Reg. 8 (c).

Not required.

APPENDIX 4

QUESTIONNAIRE ON GROVE AND FARM LOSSES IN FLORIDA CAUSED BY THE
MEDITERRANEAN FRUITFLY ERADICATION CAMPAIGN OF 1929-30

IMPORTANT.—READ REVERSE SIDE CAREFULLY BEFORE ANSWERING QUESTIONNAIRE

I, _____, _____, do
(Name) (Post-office address)hereby certify that in 1929 or 1930 I was the _____ of a grove or
(Owner, cash tenant, agent of owner, etc.)farm situated _____ from _____ in
(Miles and direction) (City or town)_____, Fla., described as the _____ of Section
(County)_____, Township _____, Range _____;
that such a grove or farm was owned in (1929 or 1930) by __________; and that the
(Name) (Post-office address)information contained herein pertains to such grove or farm and is correct to the
best of my knowledge and belief.Date _____
(Signed) _____*A. Citrus fruits, 1928-29 and 1929-30 crops*

	Oranges		Grapefruit		Tangerines	
	1928-29 crop	1929-30 crop	1928-29 crop	1929-30 crop	1928-29 crop	1929-30 crop
1. Acres in grove.....						
2. Acres in bearing trees.....						
3. Boxes sold, total.....						
a. Sprayed only (included in total).....						
b. Sterilized only (included in total).....						
c. Sprayed and sterilized (included in total).....						
d. Neither sprayed nor sterilized (included in total).....						
e. Estimation of any losses because of spraying or sterilization ("on tree" price basis).....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....
4. Boxes marketable fruit destroyed be- cause of eradication campaign.....						
5. Prices received per box sold ("on tree" price basis).....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....
a. Sprayed only.....						
b. Sterilized only.....						
c. Sprayed and sterilized.....						
d. Neither sprayed nor sterilized.....						

*B. Other marketable fruits destroyed in 1929-30, such as limes, guavas, mangoes,
avocados, etc. (Use 1 line for each fruit and explain nature of loss)*

	Quantity ¹	Value
1. _____	_____	\$_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____

¹ Express in commercial units, such as boxes or bushel hampers.

C. Vegetables destroyed, 1929 crop

	Snap beans	Toma- toes	Green peppers			
1. Acres destroyed.....						
2. Production destroyed (bushels).....						
a. Before harvested.....						
b. After harvested.....						
3. Estimated losses ("in field" price basis).....						

D. Other losses in 1929-30. (Use 1 line for each class of loss and explain nature of loss)

	Quantity	Value
1.		\$.....
2.
3.
4.
5.

[On reverse side]

MEDITERRANEAN FRUITFLY BOARD,
Orlando, Fla., July 29, 1938.

DEAR SIR: The Mediterranean Fruitfly Board, composed of five members appointed by the Secretary of Agriculture, was created by an act of the United States Congress approved May 23, 1938 (Public, No. 535, 75th Cong.). As stated in that act, the Board "is authorized and directed to conduct a complete investigation and survey of all losses sustained by growers and farmers in the State of Florida resulting from the campaign to eradicate the Mediterranean fruitfly in such State and transmit to the Secretary of Agriculture not later than March 15, 1939, a full report of the results of such investigation and survey: *Provided*, That such report shall serve as information only and shall not be construed as imposing any legal or moral obligation upon the Government of the United States. The Secretary of Agriculture shall, as soon thereafter as practicable, transmit such report of survey to Congress, together with such recommendations as he may, in his judgment, deem advisable."

To prepare its report, the Board needs the information called for in this questionnaire. The questionnaire should be filled in with pen and ink, or preferably with typewriter, and one copy returned promptly to the Mediterranean Fruitfly Board, Orlando, Fla. Since the Board has only a limited time within which to submit its report, it is requested that this inquiry be returned immediately, if possible, and not later than September 1.

Respectfully yours,

MEDITERRANEAN FRUITFLY BOARD,
JAMES W. MORTON, *Chairman*.

READ FOLLOWING INSTRUCTIONS CAREFULLY BEFORE ANSWERING QUESTIONS

1. This questionnaire should be filled in by the 1929 or 1930 owner or his agent, insofar as his losses for the particular year are concerned, unless the property was cash-rented to others; in the case of a cash-rented property, the questionnaire should be filled in by the cash tenant or his agent on the same basis. In all cases it is important that the name of the 1929 or 1930 owner be given. If the farm was owned in only 1 of the 2 years, strike out the year that does not apply.

2. The questionnaire should pertain to all the land operated in 1929 or 1930 as one unit from the same headquarters; that is, all the land operated with the same power, equipment, etc. If two or more such units were owned or operated by one person, a separate questionnaire should be submitted for each unit. If land operated as one grove or farm was located partly in two or more counties, such grove or farm should be reported in the county in which the headquarters, as the center of operations, was located.

3. Only one questionnaire should be submitted for a property. This is important in order to avoid duplication by different persons reporting for the same property.

APPENDIX 5

DEPARTMENT OF AGRICULTURE,
PLANT QUARANTINE AND CONTROL ADMINISTRATION,
December 8, 1930.

Memorandum to Mr. Hoidale.

Herewith is furnished tabulation on destructions of Florida crops during Mediterranean fly eradication campaign.

The cards from which these tabulations were made (P. Q. C. A. Forms 719 and 723) contain property descriptions and while each card was examined during the process of compilation there was not time to arrange them properly. It is most important that some provision for casing and arranging these cards should be made as they are the only basis for accurate computation. Grouping the cards according to dates should reveal the true value of the commodities destroyed upon the basis of their current market price.

An attempted reconciliation between the figures submitted herewith and figures previously recorded in the monthly reports from Dr. Newell's office is most unsatisfactory. A reconciliation between the totals obtained from the cards and the totals obtained from the weekly reports was attempted in Polk County which comprised the whole third district. This was also unsatisfactory. Further comparisons between county totals compiled from cards and district totals compiled from weekly reports were impossible due to the grouping of portions of several counties within a single district.

On page 199 of the Mediterranean fruitfly hearing record, Dr. Newell submits a figure on citrus destruction, 689,108 boxes (approximately 1% bushels each) and continues on page 200 by saying that 350,000 of the above total was marketable.

On page 1455 of the Mediterranean fruitfly record the Secret Service agents report that the plant board carried an arbitrary figure of 350,000 boxes of citrus as the total destruction of this crop. Dr. Newell's statement on the stand places the total destruction of marketable citrus within approximately 12,000 boxes of the figure shown in our report. This is either a remarkable coincidence or his compilation was made from records which we have not located.

A brief summary of the compilations made from the weekly district reports is also submitted herewith (tables A-I, A-II, A-III, and A-IV). An analysis of these data is most difficult in the face of certain errors, omissions, and almost total absence of classified detail. They are included for comparison with our report compilations headed Tables I, II, III, and IV.

BEVERLY S. GALLOWAY.

TITLE 1. DESTRUCTION OF FLORIDA CROPS DURING MEDITERRANEAN FRUITFLY ERADICATION CAMPAIGN

(Author, Beverly S. Galloway)

At page 199 of the record of Mediterranean fruitfly hearing Dr. Wilmon Newell states that the total destruction of Florida crops amounted to 689,108 boxes of citrus, 49,974 bushels of vegetables, and 27,393 bushels of minor and wild noncitrus fruit.

The reports from which these totals might be obtained are, first, the field foreman's daily reports (P. Q. C. A. Forms 719 and 723); second, the weekly district reports; and third, the monthly reports issued by the director of the eradication campaign. After examination, the second and third of these sources were found to be irreconcilable and the daily reports were consulted to establish the totals submitted in this report.

Prior to May 6, 1929, no reliable records are available, but from this date forward to January 10, 1930, daily eradication reports are on hand. Work during the period prior to the establishment of a system of recording was in a restricted area adjacent to Orlando and while no entry has been found covering destruction of citrus in the Hamlin grove, which suggests the possibility of other unrecorded destructions in quantity, the totals here presented for Orange County should not be augmented without careful consideration of reliable estimates. This suggestion is based upon certain card records dated "April 1929" which are supposedly supplementary reports indicating destructions prior to the installation of the recording system.

While this report is based wholly upon the daily card records previously mentioned and includes no single item unsupported by such records, attention is invited to the eradication work under the direction of county agents, citizens'

committees, etc. Such work accomplished considerable and although several instances point to destruction of certain commodities which were never recorded, it is probable that a large part of this independent clean-up was reported to eradication headquarters and, being so reported, is included in the totals of this summary.

It will be noted that all of the counties lying within the eradication area appear in the summary excepting Marion, Alachua, and Sumter. These areas were reported under Putnam and Lake Counties. The totals reported as "unclassified" were derived from cards listing the owner as unknown or from cards deficient in other positive means of identification.

A recapitulation of all crop destruction appears under table I.

CITRUS

For clarity citrus has been divided into five subheads: (1) Commercial, (2) noncommercial, (3) drops and culls, (4) lemon and limes, and (5) kumquats. The records do not provide a division into grapefruit, oranges, and tangerines. The total entered as commercial is comprised of lots greater than 24 standard field boxes of sound fruit. On the assumption that lots of less than 25 boxes could not be picked economically or profitably, the second subhead includes those quantities of sound citrus gleaned in amounts varying from $\frac{1}{2}$ box to 24 boxes. The third subhead is merely a summary of citrus reported as culls or drops, the latter being largely the result of the general clean-up of abandoned properties extending through the fall months to January 11, 1930. The remaining entries of limes, lemons, and kumquats are self-explanatory. The summary of citrus destruction will be found in table II.

VEGETABLES

There are no criteria incorporated in the daily records whereby vegetables may be classed as commercial and noncommercial. The totals listed are therefore composed of the positive figure presented upon each foreman's card. Hence, if the amount column on the card expressed the quantity of product destroyed in acres, a translation into bushels was manifestly impossible. Bushels and acres therefore supplement each other in the tabulated report and in no instance throughout the compilation of the report were duplicate entries of bushels and acres taken from the same card. In further explanation of the separate items of bushels and acres, attention is directed to the more adequate basic presentation of such crops as cowpeas in quantities of acres rather than bushels.

In considering all of the items listed on the foreman's cards as vegetables there are instances where none but the most exacting analysis would effect an expression of quantity. Such instances are found in entries describing the destruction of door-yard gardens a few square feet in extent containing numerous and varied articles. The sum total of such items, while representing some significance in the consideration of the owner, would not appreciably affect the aggregate of vegetable destruction.

On a separate page (table V) there has been listed a summary of items destroyed which are impossible of classification and which were probably destroyed under misapprehension. While the total of these articles is negligible, it was considered desirable to present them in this report.

In effecting a reduction of quantities to the basis of bushels it was assumed that all entries reported as boxes were standard citrus field boxes capable of containing 2 bushels. Other entries were reduced on the basis of standard dry measure or according to definite comparisons derived from the card records. All cull vegetables were excluded from the totals of this report. The summarized report of vegetable destruction appears in table III.

COWPEAS

Cowpea totals tabulated under bushels cannot be classified upon any commercial basis since the field reports give no indication whether the commodity was intended for seed or cover crop. In some instances when the peas were picked the vines were disked under. In other instances the peas were picked and the vines pulled and burned. In each of these instances the value of the crop was effectually destroyed and the total of bushels is duly recorded as the result of such destruction.

In several instances the value of an acre of cowpeas has been declared by the owner and reported upon the foreman's cards. These declarations claim from \$5 to \$6 per acre. The order rescinding the requirement for destruction of cowpeas was dated June 18, 1929. Some small amounts were destroyed subsequently.

BEANS

There is no explanation to be added to the totals appearing under bushels and acres when summarizing the destruction of beans. No declared values were observed in the examination of the records.

PEPPERS

In the Orange County truck districts, reports indicated that 1 acre of peppers in full bearing yielded approximately 250 bushels. No values were cited.

TOMATOES

No basis for comment upon the totals compiled for tomatoes was derived from the records. No values were cited.

MISCELLANEOUS VEGETABLES

The three largest individual components of the totals grouped under miscellaneous vegetables were eggplants, cucumbers, and squash. The greater portion of these totals, however, is comprised of lots of several vegetables obtained from garden plots and recorded under a single figure.

FRUITS

All wild fruits have been excluded from the totals of this report. With two exceptions, when the source was known to be from commercial plantings, bananas and guavas have also been excluded. These exceptions are noted on a separate page (table V) which groups together the destruction of some material that could not be classified under regular headings.

Computation in bushels was made on the same basis as that used in compiling vegetables—standard dry measure. Summary of all fruits destroyed appears in table IV.

AVOCADOS

It will be noted that the total of avocados destroyed in Pinellas County is 1,130 bushels. The records show that of this amount 906 bushels were returned to the owner after picking and were not destroyed or buried in the pits. In the absence of any further qualifying information all of this fruit was entered in the total as destroyed. No values were cited.

PERSIMMONS

This total includes Japanese persimmons alone. The value cited in several instances was \$5 per bushel.

PEACHES

No explanation is required for this entry. No value cited.

GRAPES

No explanation concerning grapes can be based upon information contained in the records. No values were cited.

MISCELLANEOUS FRUITS

The totals under "Miscellaneous fruits" include lots of mixed fruits obtained from dooryard plantings and several other noncitrus fruits which vary with the regional source. Thus, Brevard County contributed some few bushels of mangos; Volusia, Flagler, and St. Johns Counties some figs; and the central portion of the State pears.

None of these three products contribute an appreciable amount to the aggregate total, the major portion of which is composed of fruits listed under the headings mentioned above and entered on the records as mixed lots under a single figure.

BEVERLY GALLOWAY.

ORLANDO, FLA., December 8, 1930.

TABLE I.—*Destruction of Florida crops during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

Commercial citrus.....	boxes..	338, 727
Noncommercial citrus.....	do.....	29, 433
Limes and lemons.....	do.....	1, 261
Kumquats.....	do.....	124
Drops and culls.....	do.....	59, 523
Total citrus.....	do.....	429, 068
Cowpeas (1,690 acres).....	bushels..	3, 821
Beans (190 acres).....	do.....	7, 543
Peppers (196 acres).....	do.....	40, 011
Tomatoes (305 acres).....	do.....	25, 402
Miscellaneous vegetables (461 acres).....	do.....	23, 459
Total vegetables.....	do.....	100, 236
Total acres.....		2, 842
Peaches (7 acres).....	bushels..	1, 528
Miscellaneous fruit (3 acres).....	do.....	4, 497
Avocados (1 acre).....	do.....	1, 903
Persimmons.....	do.....	2, 132
Grapes.....	do.....	4, 448
Total noncitrus fruits.....	do.....	14, 508
Total acres.....		11

TABLE II.—*Destruction of citrus by counties during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

	Commer- cial lots	Noncom- mercial lots	Limes, lem- ons	Kumquats	Drops and culls	Total
Brevard.....	9, 859	1, 288	98	1	832	12, 078
Citrus and Levy.....		35			57	92
Flagler.....		14			3	17
Hernando.....	1, 150	15			220	1, 385
Hillsborough.....	1, 516	1, 623	32	2	2, 184	5, 357
Lake.....	32, 535	3, 982	332	18	3, 130	39, 997
Osceola.....	8, 845	996	91		353	10, 285
Orange.....	152, 718	7, 811	268	60	3, 227	164, 084
Pasco.....	133	133		34	692	992
Pinellas.....	520	1, 780	49		8, 032	10, 381
Polk.....	24, 796	4, 173	90	5	1, 771	30, 835
Putnam.....	7, 378	690	4		1, 111	9, 183
St. Johns.....	30	75			40	145
Seminole.....	13, 802	1, 243			1, 926	16, 971
Volusia.....	71, 680	3, 180	4	2	3, 370	78, 236
Unclassified.....	13, 765	2, 180	293	2	32, 575	49, 030
Total boxes.....	338, 727	29, 433	1, 261	124	59, 523	429, 068

TABLE IV.—*Destruction of noncitrus fruits, by counties, during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

	Avocados		Persimmons		Peaches		Grapes		Miscellaneous fruit		Total	
	Bush-els	Acres	Bush-els	Acres	Bush-els	Acres	Bush-els	Acres	Bush-els	Acres	Bush-els	Acres
Brevard.....	83	-----	16	-----	147	-----	83	-----	421	-----	750	-----
Citrus and Levy.....		-----	4	-----	5	-----	10	-----	28	-----	47	-----
Flagler.....		-----		-----	1	-----	16	-----		-----	17	-----
Hernando.....		1	2	-----	4	-----	2	-----	52	-----	60	-----
Hillsborough.....	120	-----	39	-----	17	-----	80	-----	44	-----	300	-----
Lake.....		-----	224	-----	162	-----	610	-----	586	1	1,582	1
Osceola.....	4	-----	12	-----	133	-----	29	-----	4	-----	182	-----
Orange.....	92	-----	175	-----	209	7	877	-----	203	-----	1,556	7
Pasco.....		-----	2	-----		-----		-----	1	-----	3	-----
Pinellas.....	1,130	-----	7	-----	14	-----	30	-----	105	-----	1,286	-----
Polk.....	64	-----	34	-----	44	-----	31	-----	295	-----	468	-----
Putnam.....	1	-----	41	-----	166	-----	190	-----	137	-----	535	-----
St. Johns.....	9	-----	266	-----	96	-----	992	-----	956	-----	2,319	-----
Seminole.....		-----	136	-----	147	-----	175	-----	117	-----	575	-----
Volusia.....	321	-----	1,100	-----	345	-----	1,102	-----	1,235	2	4,103	2
Unclassified.....	79	-----	74	-----	38	-----	221	-----	313	-----	725	-----
Total.....	1,903	1	2,132	-----	1,528	7	4,448	-----	4,497	3	14,508	11

TABLE V.—*Some additional entries*

Strawberries:		
Plants.....	individuals	20,000
Acres.....		20
Fruits and plants.....	bushels	260
Fruit.....	quarts	392
Potatoes.....	acres	2
Potatoes and corn.....	do	3
Potatoes, corn, okra, and collard greens.....	do	7
Corn.....	do	3
Collard greens.....	do	4
Cabbage.....	bushels	14
Blackberries.....	acres	2
Bananas.....	bunches	1,715
Cotton.....	row	1
Miscellaneous fruits.....	acres	8
Guavas.....	bushels	38
Do.....	acres	4

TABLE A-I.—*Destruction of Florida crops during the Mediterranean fruitfly eradication campaign, as reported weekly from districts, May 1929 to Jan. 11, 1930*

Citrus reported as being from active zones 1.....	boxes	490,910
Citrus reported as being from eradication area.....	do	25,906
Total, citrus.....	do	516,816
Total, vegetables reported from active zones 1.....	bushels	42,109
Total, noncitrus fruits reported from active zones 1.....	do	27,925

TABLE A-II.—*Destruction of citrus during the Mediterranean fruitfly eradication campaign by districts May 1929 to Jan. 11, 1930, as reported weekly*

Counties	Total of each week's entry by districts				Final totals shown for each district		
	District No.	Carried as active zones 1	Carried as eradication area	Total	Carried as active zones 1	Carried as eradication area	Total
Orange, South Lake, and Osceola.....	1	9, 583	7, 322	16, 905	333, 062	8, 898	341, 960
Brevard.....	2	1, 892	1, 179	3, 071	20, 719	1, 561	22, 280
Polk.....	3	9, 897	3, 923	13, 825	14, 312	5, 065	19, 377
Lake and Sumter.....	4	1, 095	1, 405	2, 500	1, 875	1, 408	3, 283
Seminole.....	5	1, 420	1, 386	1, 806	1, 420	464	1, 884
West Volusia and east Putnam.....	6	3, 226	322	3, 548	95, 762	425	96, 187
East Volusia.....	7	565	522	1, 087	3, 987	522	4, 509
St. Johns, Flagler, and Duval.....	8	424	-----	424	135	-----	135
Jacksonville.....	9	-----	-----	-----	-----	-----	-----
Pinellas.....	10	14, 103	4, 753	18, 856	13, 825	5, 437	19, 262
Pinellas and Pasco.....	10A	1, 512	-----	1, 512	1, 956	-----	1, 956
Hillsborough.....	11	2, 573	716	3, 289	2, 609	860	3, 469
Alachua and Putnam.....	11A	61	-----	61	60	-----	60
Marion, Putnam, and Alachua.....	12	18	-----	18	51	-----	51
Tampa.....	13	362	-----	362	443	-----	443
Levy, Gilchrist, Dixie, Taylor, and Lafayette.....	14	131	21	152	109	21	130
Gilchrist, Dixie, Taylor, and Lafayette.....	14A	8	-----	8	8	-----	8
Hernando and Citrus.....	15	19	-----	19	28	-----	28
Pasco.....	15A	475	-----	475	513	-----	513
Marion.....	22	36	1, 145	1, 181	36	1, 245	1, 281
Total boxes.....	-----	47, 400	21, 699	69, 099	490, 910	25, 906	516, 816

TABLE A-III.—*Destruction of vegetables during the Mediterranean fruitfly eradication campaign by districts, May 1929 to Jan. 11, 1930, as reported weekly*

Counties	District No.	Totals of each week's entry by districts	Final total shown for each district
Orange, South Lake, and Osceola.....	1	32, 540	32, 540
Brevard.....	2	11	1, 029
Polk.....	3	1, 011	906
Lake and Sumter.....	4	159	561
Seminole.....	5	916	916
West Volusia and east Putnam.....	6	-----	-----
East Volusia.....	7	45	981
St. Johns, Flagler, and Duval.....	8	2, 640	3, 606
Jacksonville.....	9	-----	-----
Pinellas.....	10	444	650
Pinellas and Pasco.....	10A	7	154
Hillsborough.....	11	8	13
Alachua and Putnam.....	11A	381	70
Marion, Putnam, and Alachua.....	12	30	329
Tampa.....	13	231	147
Levy, Gilchrist, Dixie, Taylor, and Lafayette.....	14	158	158
Gilchrist, Dixie, Taylor, and Lafayette.....	14A	12	12
Hernando and Citrus.....	15	-----	-----
Pasco.....	15A	33	37
Marion.....	22	-----	-----

Total (of weekly entries for all districts).....bushels..... 38, 626
 Total (of final entries shown for all districts).....do..... 42, 109

TABLE A-IV.—*Destruction of noncitrus fruits during the Mediterranean fruitfly eradication campaign by districts, May 1929 to Jan. 11, 1930, as reported weekly*

Counties	District No.	Totals of each week's entry by districts	Final total shown for each district
Orange, South Lake, and Osceola.....	1	10,588	9,752
Brevard.....	2	677	1,298
Polk.....	3	431	347
Lake and Sumter.....	4	2,274	403
Seminole.....	5	4,594	4,577
West Volusia and east Putnam.....	6	160	144
East Volusia.....	7	253	3,023
St. Johns, Flagler, and Duval.....	8		
Jacksonville.....	9		
Pinellas.....	10	3,175	5,069
Pinellas and Pasco.....	10A	381	1,358
Hillsborough.....	11	51	13
Alachua and Putnam.....	11A	10	10
Marion, Putnam, and Alachua.....	12	195	473
Tampa.....	13	1,200	941
Levy, Gilchrist, Dixie, Taylor, and Lafayette.....	14	257	236
Hernando and Citrus.....	15	1,457	131
Pasco.....	15A	150	142
Marion.....	22	8	8

Total (of weekly entries for all districts).....	bushels..	25,861
Total (of final entries shown for all districts).....	do....	27,925

APPENDIX 6

REPORT OF THE COMMITTEE OF CITRUS GROWERS APPOINTED BY DR. WILMON NEWELL, PLANT COMMISSIONER AND AGENT, P. Q. C. A., TO INVESTIGATE THE INJURY, IF ANY, TO CITRUS GROVES RESULTING FROM SPRAYING WITH THE SO-CALLED BAIT-SPRAY

ORLANDO, FLA., January 21, 1930.

Dr. WILMON NEWELL,
Agent and Plant Commissioner,
Plant Quarantine and Control Administration,
Orlando, Fla.

DEAR DR. NEWELL: The committee of orange growers appointed by you to investigate the injury, if any, to citrus groves resulting from spraying them with the so-called "bait spray" to poison the Mediterranean fruitfly, submits the following report:

The committee was composed of Senator John S. Taylor, of Largo, Pinellas County; Capt. Rupert Smith, of Arcadia, De Soto County; Mr. A. R. Trafford, of Cocoa, Brevard County; Mr. S. L. Harris, of Eustis, Lake County; and Mr. William L. Drew, of Eagle Lake, Polk County. The committee selected Mr. Drew to act as its chairman.

The members of the committee were to be reimbursed for their traveling expenses but were to receive no compensation. The committee was asked to visit the different citrus growing portions of the State and to use its own judgment as to the nature of the investigation; but to try to ascertain if the "bait spray" had injured the trees and fruit where it had been applied and to report its findings freely and impartially whatever might be the conclusion arrived at.

The committee being unfamiliar with what properties had been sprayed with the "bait spray" and what not, asked to be furnished with a guide, and Mr. C. C. Thullbery who had been in general charge of the "bait spray" in the State was designated, and traveled with the committee. He was very efficient and led the committee to many groves which the owners believed had been injured by the "bait spray" and to other groves which the committee expressed a wish to see.

The committee began its work on December 3, 1929, and finished on January 21, 1930. Within these dates 9 days were spent in examining groves and 3 days getting together, discussing how the investigation should be conducted, comparing observations and agreeing upon and preparing the report. The committee inspected and made notes upon 43 different groves and examined without making notes a considerable further number. The territory covered lay in Polk, Highlands, De Soto, Hillsborough, Pinellas, Lake, Marion, Orange, Putnam, Volusia,

and Brevard Counties, especial attention being given to those regions which had been in the infested areas and consequently sprayed with the "bait spray" the largest number of times.

There are many things which, either separately or in combination may injure a grove and give it an unthrifty appearance. Some of these are starvation, non-cultivation where cultivation is essential, attacks of scale and other insects, die-back, wither-tip, melanose, foot-rot, bark diseases, and freezing cold. When the committee began its inspection of groves it was therefore on the lookout for the effects of these well-known troubles, as an explanation for the condition of the grove under examination; but as the work proceeded it became increasingly apparent to all members of the committee that there is such a thing as a "bait spray" injury. It will vary from slight to severe; but it is here described where the injury has been severe.

DESCRIPTION OF INJURY (SEVERE INJURY ONLY)

Take a grove of orange trees about 6 years old. The growth of the top of the trees is alive and generally it is also alive at the bottom; but the twigs and smaller branches in the middle part of the trees are mostly dead. This may be all of the way across a tree, or it may be limited to a large more or less round but irregular hole. The wood that is not dead seems to have been weakened so that the growth that it puts out is weak and unthrifty in appearance. The foliage remaining on the trees is sparse. The leaves are likely to be dull, small, and faded in color. If the trees have been stimulated with fertilizer or by cultivation and have responded at all the growth is likely to contain a considerable number of weak water-sprouts in the tops of the trees above the dead and weakened portions. This is probably due to the inability of the trees to grow except at the top and then the top is unduly stimulated.

Where the condition exists as above described the committee has usually found contributing factors in addition to the "bait spray." The most common one is hunger; but it may be a tendency toward die-back or some other cause that has weakened the trees and made them less resistant. If the trees were well fed and otherwise healthy when the "bait spray" was applied they either resisted it so that no evidence of injury could be observed, or the apparent injury was largely confined to a certain portion commonly spoken of as a "spray hole" the remaining portion of the tree appearing normal. There are gradations all the way between the two extremes. As it seems pretty clear that a tree already weakened from some other cause has been constitutionally hurt by the "bait spray," it may be true that a tree that shows only a local hurt has suffered more harm than now appears. Time can only make that clear. Nor have we now any present evidence as to how quickly a seriously injured tree will respond to feeding and good care. Time only can answer that question.

POWER VERSUS KNAPSACK SPRAYERS

For a while the committee was under the impression that no harm had been done to trees where knapsack sprayers had been used. In time this opinion had to be modified. It remains true, however, that much of the greater amount of damage has resulted from the use of power sprayers. Frequently the power sprayer always ran in the same middle in a grove and sprayed the rows on each side. As it passed, the tree would receive a shot, and usually that shot would strike the tree near the same place that the previous shot had struck it. When the tree had been sprayed many times in this manner a "spray hole" was commonly formed. The hole was not far from the same size whether the tree was large or small; but if the tree was small it might reach across the tree and so not appear as a hole. Also if the tree was small and the pressure great the shot might go clear through the tree and kill the growth all the way to the farther side. Also, the small tree in proportion to its size got a much larger dose than did a large tree. It is not surprising, therefore, that small trees have suffered much greater harm than have large trees.

In a grove of 10-year-old orange trees, examined by the committee, where the power sprayer had followed the same course each time, one could stand at the end of the middle where the sprayer had gone and see the faded-out appearance of the leaves, and the weak young growth that had followed partial defoliation, the whole length of the rows, which were approximately a quarter of a mile long. In the next middle where the sprayer had not traveled there was no such appearance. Most of these trees showed the "spray hole" on the sprayed side and not on the other side. If the knapsack sprayers had been used the trees would not have been

truck at the same spot each time, the spray could have been directed away from the leaves and small branches, and much less harm might have resulted. It is also probable that the quantity of spray per shot from the low-pressure knapsack sprayer is less than from the high-pressure power sprayer. As to this, however, the committee is not informed. The injury from knapsack sprayers observed by the committee has been confined to trees of smaller size and in poorer condition than the trees mentioned above.

INFLUENCE OF QUALITY OF LAND

Much more "bait spray" damage has been observed on light sandy lands than on stronger sandy loams and hammock lands. The explanation of this may be that the trees on the heavier lands do not often suffer from hunger sufficiently to reduce their resistance to the bait spray.

INFLUENCE OF SIZE OF TREES

This question has been partially discussed under the heading "Power versus Knapsack Sprayers." The injury caused by the bait spray is pretty nearly in inverse proportion to the size of the trees. No certain injury to very large trees has ever been observed by the committee. Distinct damage to well-grown 10-year-old orange trees has been observed although the trees were well fed and well taken care of. There are inconsistencies, however, that the committee cannot explain. It viewed a 3-year-old grove formerly in zone 1 which had been regularly sprayed with a power sprayer. The trees were in good foliage and looked thrifty. There was no sign of injury.

INFLUENCE OF VARIETY

Pineapple orange trees seem more subject to injury than other varieties observed. Valencia orange trees are also injured. Dancy tangerines are resistant but not immune. Grapefruit trees, while not immune, are very resistant.

NUMBERS OF TIMES SPRAYED

The committee has seen no injury either to trees or fruit where the spraying was done only four times. Where injury has been observed the trees have been sprayed 14 or more times.

DROPPING OF FRUIT

Growers complain of a heavy drop and many attribute it to the effects of the bait spray. The committee has found the same complaint in portions of the State where the trees have not been sprayed. Maturity of fruit this year is fully a month earlier than usual. This is true around Arcadia, where almost no bait spraying has been done. Heavy drop may go with early maturity. The committee cannot say that the bait spray has caused fruit to drop except where the fruit has been burned by the spray. As to this, see under the next heading.

EFFECT OF THE SPRAY ON FRUIT

The only investigation that the committee has made as to the effects of the "bait spray" on the fruit is to taste the fruit. Where orange or tangerine trees have been visibly hurt the fruit usually seems too sweet, and the more injury to the tree the less pleasing the taste of the fruit. Oranges and tangerines taken from the trees showing spray burn on one side are likely to taste flat and insipid on the side of the tree showing the burn, and more normal on the uninjured side. The committee is not willing to say that fruit is normal on trees showing no visible injury; but much good-quality fruit has been tasted taken from such trees although they have been sprayed with the "bait spray" 14 or more times. In 2 groves of old trees where a row of trees in each grove was pointed out to the committee as having been left unsprayed as a check, no difference could be detected either as to the appearance of the trees or in the taste of the fruit in those rows, as compared with the rows that had been sprayed the regular number of times for zone 1. On the other hand, the committee examined a block of Valencia trees 5 years old on good-quality land which trees showed the characteristic spray burn. The fruit taken from these trees was so totally without acid that no taste of it could be detected. This was on the 26th of December when the fruit of this variety should hardly be mature.

A block of tangerine trees 8 or 9 years old having been sprayed the regular number of times for zone 1 was holding a very heavy load of exceptionally fine fruit. The trees seemed uninjured and the fruit tasted entirely normal.

The committee has found no injury to the quality of grapefruit whether the trees show injury or not. As stated in another place, grapefruit trees are very resistant to the spray.

The committee has observed some cases where the fruit has apparently been burned by the "bait spray." The burn is on one side, roundish, 1 or 2 inches in diameter, brown in color, hard, and likely to be cracked or checked. The committee has been told of other cases where the fruit has dropped off and been buried. This form of injury does not seem to be very common but the committee is convinced that it does sometimes occur.

SUMMARY

1. The amount of injury caused by the "bait spray" can easily be, and often has been exaggerated. Many of the groves that have been sprayed 14 or more times show no injury to trees that can be detected and but little, if any, injury to fruit. This is generally true of trees 12 or more years old that were in a healthy and vigorous condition when the spraying began, and were not allowed to suffer from hunger. Where trees of this age have been allowed to suffer from hunger it is usually not possible to determine how much, if any, the "bait spray" may have contributed to their impaired vigor.

2. Injury has sometimes resulted in groves less than 12 years old ranging all the way from slight to severe. Here again the condition of the trees when sprayed is a very important factor. If healthy and well fed the harm resulting to trees of a particular size is likely to be much less than when the trees have been weakened by hunger or other causes. Vigorous well-grown trees from 8 to 12 years old usually show but slight evidence of injury. Younger trees are in much greater danger of harm from the spray and serious injury has often resulted. Where the trees have been weakened by hunger or other cause the injury has often been severe.

3. Where injury has resulted it is manifested by the weakening and gradual death of the twigs and smaller branches which have been repeatedly struck by the spray. In the most severe cases the foliage on the living portions of the tree is sparse, the leaves are small, faded, and lifeless in appearance. New growth, if any, is weak and unthrifty.

4. The injury has been more severe, in groves where injury has occurred, where the spraying has been done by power sprayers than where knapsack sprayers were used.

5. The damage is much more prevalent on trees grown on light, sandy lands than those on heavier sandy loams and hammock lands.

6. The smaller the tree the more susceptible it is to injury from the spray.

7. Pineapple orange trees seem more subject to injury than other varieties observed. Valencia orange trees are also injured. Dancy tangerines are resistant but not immune. Grapefruit trees, while not immune, are very resistant.

8. No injury has been observed where the trees were sprayed only four times.

9. Fruit has matured at least a month earlier than usual this year, and there has been an abnormally heavy drop. This has occurred in all parts of the State in sections where no spraying has been done as well as where the "bait spray" has been used.

10. Injury to fruit is manifested by loss of acidity and consequent flatness of taste. It is greatest where trees have suffered most, and least where trees have suffered least. Some fruit has been burned by the spray; but this injury is not very common.

In conclusion the committee wishes to make the following statement:

The presence of the Mediterranean fruitfly in the State is a very serious menace to the citrus industry. Those who assert that it has been with us for a long time should prove their assertion. This committee does not believe it to be true. If the industry is to live the fly must either be eradicated or controlled. If control rather than eradication measures are adopted, all States that have reason to fear the fly will quarantine against all Florida products that are hosts of the fly. This, of course, if the Federal Government does not do it for them. Those quarantines will continue until the fly has spread into all of those States and they have no longer any reason to fear invasion from Florida. It is possible then that the time may come that unceasing and expensive control measures and the introduction of parasites may bring the fly under commercial control. This condition will not be reached for many years. Meanwhile, the industry will have perished for want of

a market and will have to be started all over again when the readjustment is completed. That is not a pleasant prospect for the present generation of growers.

The committee believes that the present favorable progress toward eradication is largely due to the use of the arsenic "bait spray." Nothing was known that could be substituted for it and there was no time to search for a substitute. Its use was therefore justified and wise. It was known that damage to trees and fruit might result from its use; but there was no reasonable alternative. This committee believes that the beneficial results of the "bait spray" far outweigh the damage that has occurred. To blame the National Department of Agriculture and the State Plant Board for using the arsenic spray the committee believes to be unwise and unjust. While the "bait spray" was being used investigators have been searching for a substitute, and one has been found containing no arsenic which there is reason to believe will prove equally effective. The committee hopes that this may prove to be true and the use of arsenic can be discontinued.

The committee has tried in this report to state the facts as it finds them, and at the same time not to lose sight of the peril that confronts the horticultural interests of the State.

Respectfully submitted.

WM. L. DREW, *Chairman.*
JOHN S. TAYLOR,
RUPERT SMITH,
A. R. TRAFFORD,
S. L. HARRIS.

DECEMBER 28, 1929.

Dr. WILMON NEWELL,
*Agent and Plant Commissioner,
Plant Quarantine and Control Administration, Orlando, Fla.*

DEAR DR. NEWELL: The committee appointed to investigate the injury, if any, resulting from spraying citrus trees with the so-called "bait spray" supplements its report of general conclusions, with this list of groves examined, and comments on their condition.

The groves are discussed in the order that they were examined by the committee.

DECEMBER 4, 1929, SAMPLE BROTHERS GROVE NO. 1, NEAR HAINES CITY

Grove consists of a block of small tangerine and orange trees, on the south side of a private road, and another block of larger tangerine trees on the north side. The grove was in zone 1, and trees have been sprayed 14 times with the bait spray, a power sprayer being used. The smaller trees show much greater evidence of hunger than the block of larger trees. There is a large amount of deadwood in practically all of these trees, the tops of the trees are alive and generally the part of the trees nearer the ground, the deadwood appearing particularly in the middle portion where it is said that the spray was thrown.

The smaller twigs are entirely dead, but not the larger branches. The trees are in a low state of vitality. How much this is due to the bait spray the committee does not know, but it is the opinion that the trees indicate that it has been a factor. The block of larger tangerine trees are in good vigor and show little, if any, injury that could be attributed to the bait spray.

At the time that the investigation was made the committee did not realize as clearly as it later did that the same sort of spraying apparently causes a much greater injury to small trees than to larger ones, and this may be the reason for the difference in the two blocks.

DECEMBER 4, 1929, RANDALL GRAPEFRUIT GROVE, NEAR HAINES CITY, ZONE 1

Trees 15 to 20 years old, well fed and well cared for, sprayed 16 times with power sprayer. There is only a normal amount of deadwood, and nothing in the grove that looked like spray injury was observed.

DECEMBER 4, 1929, SAMPLE BROS. GROVE NO. 2, ZONE 1

Grove of orange trees said to be 6 or 7 years old but looked younger. Had the same condition as is reported in grove No. 1 on the younger block. This grove adjoins a grove of much larger orange trees in excellent condition, and with no evidence of spray injury, although it is said to have been sprayed the same as the other.

DECEMBER 4, 1929, GRAPEFRUIT GROVE OWNED BY PICKARD BROS. OF LAKE LAND,
DUNDEE SECTION, ZONE 1

Grove of mature trees with some deadwood but generally in good condition. Nothing observed that looked like spray injury. Said to have been sprayed 14 times. Fruit seemed entirely normal and good quality.

DECEMBER 4, 1929, TANGERINE GROVE FORMERLY OWNED BY FRANK BRIGHAM ON
THE ELOISE LOOP, WINTERHAVEN SECTION, ZONE 1

Reported sprayed 14 times. Found the fruit very variable, some of it insipid, some of it normal, some of it very sour. Some dried out and some very juicy. Found some of this variableness on fruit from the same tree. Grove on heavy land.

DECEMBER 4, 1929, HILLCREST GROVE NEAR AVON PARK, ZONE 3

Not sprayed with bait spray. Examined for comparison with groves that had been so sprayed. This grove fertilized in November 1928, and not again until July 1929. Otherwise neglected. Grove just reaching bearing age. Developed much deadwood as a result of hunger and neglect, which had been mostly pruned out. The deadwood observed does not appear in solid areas as it did in the Sample groves. The soil was similar to that observed in the Sample groves. No evidence that looked like what the committee has learned to regard as a spray injury.

DECEMBER 5, 1929, VARIOUS GROVES AROUND ARCADIA

Examined for the same purpose as the other, as a comparison of those that had been sprayed with the bait spray and those that had not. Found varying conditions but nothing that looked like the typical spray burn that the committee has found in zone 1.

DECEMBER 5, 1929, ANDERSON GROVE, TAMPA, ZONE 1

Block of orange and tangerine trees having a considerable crop. Trees small. Many of the tangerine trees show considerable deadwood in the form of a solid area which looked like a spray burn. Don't understand that this owner has made any complaint. Large seedling trees in same grove show much deadwood, but not such as the committee could attribute to a spray burn.

DECEMBER 6, 1929, JAMES E. ROACH GROVE, TAMPA, ZONE 1

Sprayed 15 times. Grove of oranges and grapefruit on east and west sides of driveway from street to house. Some damage observed on the west side but much less than that observed on the east side of the driveway. Trees apparently well fed and cared for. This was the first grove examined where the injury from the spray was so uniformly apparent that the committee felt no doubt of the fact. One could stand at the end of the rows where the power sprayer had gone and see the faded-out appearance of the leaves, and the weak young growth that had followed partial defoliation, the whole length of these rows which were approximately a quarter mile long. This appearance would be on the side of the trees that had been sprayed. In the next middle, where the sprayer did not go, there was no such appearance. As one walked down the rows on the injured side there was a hole more or less round in a large number of those trees where the smaller branches had been either killed or greatly weakened. This committee has learned to call these the "spray holes." In a portion of the grove where fruit was examined, the fruit on the side of the tree that had been injured would be very insipid, while that on the opposite side was more or less normal.

Those trees on the east side of the driveway were about 10 years old.

DECEMBER 6, 1929, EUBANKS GROVE, TAMPA, ZONE 1

Grove consists of grapefruit, tangerine, and orange trees 8 years old, apparently well fed and not lacking in general care. Well loaded with fruit. Grapefruit trees showed but little injury in general from the spray, but trees at the end of the row where the sprayer turned showed a streak of deadwood right across the trees. In general the conditions were very similar to those observed in the Roach grove, and showed injury which the committee did not doubt was due to the bait spray.

DECEMBER 6, 1929, J. H. ROBLES GROVES, TAMPA, ZONE 1

Grove consists of a block of large seedling trees and blocks of young oranges, grapefruit, and tangerines. Had deadwood everywhere, even in the large seedling trees, but no evidence of spray injury in these trees. The younger blocks were very unthrifty, apparently starved; in fact, so unthrifty and far gone that it was impossible to tell whether the spray had been a factor in their condition or not.

DECEMBER 6, 1929, ROBERT DEKLE GROVE, TAMPA, ZONE 1

Grove consists of 7- to 12-year-old orange and grapefruit trees. Grove well fertilized and cared for, in excellent condition without apparent injury from bait spray, and examined as a comparison of the effect of bait spray on groves of that character located in the region of the Robles and Eubanks groves.

DECEMBER 6, 1929, C. E. COBB GROVE, SOUTH OF LARGO, ZONE 1

Marsh seedless trees on excellent land. Trees 7 years old in fine condition. Sprayed with power sprayer 15 times. No spray injury apparent.

DECEMBER 6, 1929, C. W. MIXON GROVE, SOUTH OF LARGO, ZONE 1

Large trees, mostly grapefruit, in good condition and on good land. No spray injury apparent.

DECEMBER 7, 1929, LESLIE ALONZO GROVE, PALM HARBOR, ZONE 1

Orange, grapefruit, and tangerine trees, about 15 years old. Grove apparently starved and neglected. Much deadwood, some evidence of spray injury on side of the trees that was sprayed. Trees in too unthrifty condition to be sure of the extent of the injury caused by spraying.

DECEMBER 7, 1929, GEORGE KERSEY GROVE, PALM HARBOR, ZONE 1

Trees young, showed typical spray holes. Fruit very flat.

DECEMBER 7, 1929, H. L. GRIDER GROVE, PALM HARBOR, ZONE 1

First examined block of large grapefruit trees in good condition. This block was sprayed with knapsack sprayers. Trees with good crop, fruit all right. No injury evident. There is a block of Homosassa orange trees of moderate size. Fruit dry and worthless. Fruit also insipid and some of the fruit showed a burn not due alone to sun. The burn is on one side, roundish, brown, hard, and often cracked or checked. The committee, in its investigation, has not found this burn very often, but has reason to believe that it is connected with the bait spraying in this grove.

A block of medium-sized grapefruit trees shows the same character of burn on some of the fruit. There is evidence of ammoniation in this grove. The grove has been plowed. Fruit is rather coarse in texture and bears evidence of overstimulation and cultivation.

DECEMBER 7, 1929, STEPHEN CHASE GROVE, PALM HARBOR, ZONE 1

The committee examined only that part of the grove consisting of rather young Valencia, grapefruit, and Pineapple trees. The Pineapple trees are mixed in with grapefruit trees in the same row. The trees are in a sod, mostly Natal grass. The Valencia trees showed the characteristic spray burn, but less in amount than did the Pineapple trees, where it is quite severe. The grapefruit trees in the same rows, and sprayed the same way, did not show it at all.

The oranges examined seemed too sweet and quite insipid. The grapefruit was all right. The grove is not markedly hungry.

DECEMBER 7, 1929, B. F. FLETCHER GROVE, PALM HARBOR, ZONE 1

Trees 8 to 10 years old. Mostly oranges. Sprayed with power sprayer from all sides. Spray hole so often observed was not apparent, but in its place the smaller wood was dead all around the trees, the living portion appearing especially at the top. Grove in very poor condition.

DECEMBER 12, 1929, GEORGE B. MAGIE GROVE, GRAND ISLAND, ZONE 1

Sixty acres. Block of large Parson Brown trees sprayed with the arsenic spray in 1924 over all the tree to sweeten the fruit. Sprayed this year regularly with the bait spray. These trees show considerable deadwood all through the trees. Trees are rather badly frenched. Nothing in this block that one could feel sure was due to the bait spraying. Fruit apparently normal for the variety.

Balance of the grove had a heavy crop of *crotonaria* as a cover crop. This has been grown for two successive years.

Blocks of Valencia, tangerine and Pineapple trees, apparently 5 or 6 years old. All these blocks showed distinct ammoniation. Trees are yellow, with more than a little frenching. Trees not in good vigorous condition. Fruit has been picked, but the owner stated to the committee that much of it had been burned and had dropped. The committee is not able to say how much or if any of the conditions observed were caused by the bait spray.

DECEMBER 12, 1929, DR. LYTLE GROVE, WEIRSDALE, ZONE 1

Young Parson Brown trees 4 or 5 years old. Sprayed with knapsack sprayers. Trees rather yellow, without being frenched. A very considerable amount of defoliation. This especially where a grass cover crop was grown, and less where a cover crop of *crotonaria* was grown. Having been sprayed with knapsack sprayers, there would naturally be no regular spray hole, and if there is spray damage in these trees it does not appear in that form. The trees, however, do not have a normal appearance, and the committee thinks it probable that the bait spray has been a contributing factor. The trees bear evidence of having suffered from cold.

DECEMBER 12, 1929, E. E. REED GROVE, WEIRSDALE, ZONE 1

Large trees 20 years old. Considerable deadwood, some of it quite large. Sprayed with power sprayers once, afterward with knapsack sprayers. Outside of pruning, the grove shows good care and appears to be well fed. Bait spray injury not evident.

DECEMBER 12, 1929, E. G. PINLEY GROVE, LAKE YALE SECTION, ZONE 1

Committee asked to be shown a grove of small trees that had been regularly sprayed with the bait spray and showing no injury, and this grove was shown for this purpose. Trees 3 years old, in good foliage, fairly thrifty, no defoliation. Sprayed with power sprayer. Committee unable to explain why trees should not have been injured.

DECEMBER 12, 1929, J. R. ERVIN GROVE, LAKE YALE SECTION, ZONE 1

Just across the road from the Pinley grove. Trees 8 to 10 years old. Orange grove. Apparently well fed and in good condition. No spray damage apparent.

DECEMBER 13, 1929, WATERMAN GROVE, EUSTIC, KNOWN AS BLUE LAKE GROVE, ZONE 1

Much of the grove consists of large old trees. Many affected by bark diseases and foot rot. Trees were sprayed all over once with the bait spray and afterward in the regular manner. Trees showed considerable deadwood. Leaves are small and the foliage generally faded. Whether this is due to the bait spray is uncertain. At least no distinct evidence of injury.

DECEMBER 13, 1929, E. LAROE GROVE, BLUE LAKE SECTION, ZONE 1

Trees 4 years old. Valencias. Committee has reason to believe that they were underfertilized. Leaves yellowed. Small growth dead in interior of trees. Quite a bit of red scale. Committee believes, nevertheless, that the bait spray has been a factor in the condition of this grove.

DECEMBER 13, 1929, H. S. & E. J. BURRELL GROVES, EUSTIS, ZONE 1

This was an infected grove. Large Pineapple trees north of private road; foliage good color, leaves normal size. No apparent injury from bait spray.

Block of Pineapple trees south of private road 8 to 10 years old, good condition, showing no injury. Adjacent to this block is a block of Valencia trees of the

same age. This block is in poor condition, showing a large amount of deadwood all around the lower part of the trees. Sprayed by power spray, owner said, on all sides. Owner states that these trees had a very heavy crop of fruit the previous year, which was held until April, while the Pineapple trees were picked early in the season. All of these trees were sprayed with an oil-emulsion spray in September. The deadwood appeared some 2 weeks after this oil-emulsion spraying, according to statement made by owner.

The committee is wholly unable to determine whether the oil-emulsion spray had anything to do with the condition of these trees or not, or how much, if any, their condition is due to the bait spraying.

DECEMBER 13, 1929, LAKE COUNTY GROVE CORPORATION, SORRENTO, HEAD OFFICE AT EUSTIS, 1,200 ACRES, ZONE 1

There was first examined a 20-acre block of Pineapple, Valencia, tangerine, and grapefruit trees of 5 years in age. In the Pineapple variety there was distinct evidence of die-back trouble some time in the past, showed by lumpy and crooked growth. There was also evidence of considerable amount of scale, most of which was now dead from fungus. In the Pineapple block particularly, the smaller growth was largely dead in the middle of the trees, leaving livewood at the top and at the bottom, and in the tops there was evidence of water-sprout growth, apparently caused by not being able to grow over the entire tree in the normal way.

The Valencias showed the same condition in less degree; the tangerines in still less; and the grapefruit least of all. This condition was very uniform throughout this portion of the grove and was to be found in almost all of the trees. Whatever other contributing factors there may have been, such as scale and cold, it is the opinion of the committee that the bait spray was also a contributing factor.

The committee also examined a portion of the grove at the top of the hill on the west of the barn, which had the characteristic spray injury but where the deadwood had been pruned out in October. Some subsequent dying of wood had occurred in this block but quite limited in extent so that it appeared as though the wood was not going to continue to die.

Other portions of the grove were also examined and where the trees were large enough to admit of a spray hole it was quite generally to be found. None of these blocks were so badly injured nor looked in such poor condition as did the first block mentioned in this report.

The superintendent and manager informed the committee that the trees were sprayed with a power sprayer and with a pressure as high as 450 pounds to begin with, and that instead of shooting the bait spray into the trees with one shot they were shot three times as the sprayer passed for three sprayings; and then twice for two sprayings, and after that only once. The high pressure mentioned was not said to be continuously used but was in the early sprayings.

DECEMBER 14, 1929, HAMLIN GROVE, ORLANDO, ZONE 1

This is a grove of very large and old trees. It was reported to the committee that the trees were sprayed all over once, and after that the spray was shot into them in the usual way. These trees were too large to determine anything about whether deadwood appearing in the trees had been caused by the bait spray or not.

Some of the oranges tasted were very sour, but the amount of acid varied greatly in the different fruit and the fruit was less insipid than the committee expected to find it from the history of the grove.

DECEMBER 14, 1929, J. B. FULLER GROVE, ORLANDO, ZONE 1

About 10 acres of 7 year old Valencia and grapefruit trees. This grove shows characteristic spray burn, rather moderate in extent. Grove apparently well fed and well cared for.

There is a block of large grapefruit trees also on this property which show no spray damage.

DECEMBER 14, 1929, STACY GROVE, ORLANDO, ZONE 1

Twenty acres. Trees in unthrifty condition. Foliage rather sparse. Appearance of hunger. Considerable deadwood scattered through the trees. No pronounced spray hole but grove said to have been sprayed both ways. Amount of injury caused by spray quite uncertain.

DECEMBER 14, 1929, NEW SOUTH DEVELOPMENT CO. KNOWN AS GILES GROVE, ORLANDO, CONWAY SECTION, ZONE 1

One hundred and seventy-five acres. Trees apparently well fertilized and in vigorous condition. No material damage to the trees from the bait spray observed. Fruit examined was in many cases pretty sweet, and some of it decidedly insipid.

DECEMBER 14, 1929, NEW SOUTH DEVELOPMENT CO., GROVE KNOWN AS METCALF GROVE, WINDEMERE SECTION, ZONE 1

Block of Pineapple and Valencia trees 7 years old, apparently well cared for and fertilized. Many of the trees showed characteristic spray hole often distinct and pronounced, but notwithstanding this evident injury, the trees looked to be in vigorous condition.

There was a tangerine block 8 or 9 years old, very heavily loaded with exceptionally fine fruit. Tangerines show very little dryness. Were in good flavor and the trees were in vigorous condition and showed no evidence of bait-spray injury.

DECEMBER 26, 1929, J. D. FRIERSON GROVE, DELAND, ZONE 1

Block of Valencia trees 5 years old. Showed characteristic spray hole. Were partly defoliated with much deadwood. Trees apparently well cared for. Fruit on these trees totally without acid, and flat in taste.

Block of tangerine trees same age showed same condition but less pronounced. Fruit very sweet.

Orange trees perhaps 20 years old, sprouts from old stumps. No apparent spray injury to the trees. Fruit believed to be too sweet, but not so bad as the fruit on the young Valencia trees.

DECEMBER 26, 1929, W. O. PAINTER GROVE, DELAND, ZONE 1

Ten acres young trees apparently neglected. Showed considerable deadwood and defoliation. Local resident says grove not fertilized. Cultivated recently.

DECEMBER 26, 1929, JOHN GRAYNOR GROVE, DELAND, ZONE 1

Large orange trees in fine condition. No spray damage observed. Trees show no deadwood. Oranges very sweet. Tangerines normal, a little bit over-ripe.

DECEMBER 26, 1929, VICTOR CARYER, CRESCENT CITY, ZONE 1

This is a grove of large trees in which one row was reported to the committee to have been reserved for a check and was not sprayed with the bait spray.

Spraying done with power sprayers. There was no observable injury to the trees and although the committee ate fruits from both the sprayed and unsprayed rows, there was no difference between the two that could be detected. Both seemed to be normal.

DECEMBER 26, 1929, GROVE ACROSS THE STREET FROM THE LAST-MENTIONED GROVE, ZONE 1

This grove, also of large trees, also contained a check row reported not to have been sprayed. No difference could be seen either as to tree or fruit between the sprayed rows and the check.

DECEMBER 27, 1929, J. M. JACKSON, NEW SMYRNA SECTION, 9 MILES OUT, ZONE 1

Five acres of young trees sprayed with knapsack sprayers. Trees in younger block were left in the rows from an old nursery. Trees in very poor condition. There was much evidence of scale. The trees were in such condition as to make it not possible to determine what factor the bait spray had played.

A block of older trees, also in very poor condition, showed quantities of deadwood, pretty much around the entire trees. The owner stated that he had ceased to fertilize and care for the trees until the Government would let him alone, and the trees showed much evidence of hunger. Here, again, what factor the bait spray had in killing out the wood could not be determined. This grove is located on a very light, sandy soil, and it is very dependent, therefore, upon feeding and care to keep in condition.

DECEMBER 27, 1929, R. J. BROOKS GROVE, OAK HILL, ZONE 1

Five acres sprayed with knapsack sprayers. Grove consists of grapefruit, tangerine, navel, and Pineapple trees on sour orange root, reported to be 12 years old. Grove is located on high, sandy soil of poor quality. Cover crop mostly sandspurs. Trees looked dwarfed and hungry. Said to have been fertilized in August with 14 pounds of fertilizer, but little evidence that it had taken effect. There were dead areas in these trees that looked like bait-spray burn, especially on the smaller trees. The committee believes that the poor condition of the trees has been aggravated by the bait spray.

DECEMBER 27, 1929, LEE DYAL GROVE, OAK HILL IN TURNBULL HAMMOCK, ZONE 1

Trees reported to have been fertilized this year. Observed from the road only, as ditches full of water lay between. Trees appeared to be in good, vigorous condition and no injury that could be attributed to the bait spray was observable from the road. Understand that no claim has been made that injury resulted.

This grove was examined to get a comparison between groves that had the same spray treatment on the high, poor, sandy land and those on the heavier-hammock lands.

DECEMBER 27, 1929, JAMES A. TAYLOR GROVE, SHILOH, ZONE 1 (KNOWN AS THE DEFREISE GROVE)

Trees from 16 to 24 years old. Heavy hammock land. Cover crop Bermuda, sandspurs, and weeds. Fertilized in the summer. Trees in fine condition. There was some deadwood which the owner was inclined to attribute to the bait spray but it was not evident to the committee that the spray had caused this. Knapsack sprayers were used. Fruit was of a very fine quality, that tasted being Pineapple, grapefruit, and Valencias.

DECEMBER 27, 1929, O'HARA GROVE, MERRITT'S ISLAND, ZONE 1

Orange trees practically 18 years old. Owner complained that fruit and leaves were burned by the bait spray. The foreman of the bait-spray crew says that the fruit was burned by lime sulphur by the owner and that the same burn appeared in a portion of the grove where the bait spray had not been put on because the crew was stopped by rain. The committee did not see any evidence of this burning nor anything that looked like a bait-spray injury. Fruit well advanced in maturity, a little sweet, good flavor, skin green.

NOTE.—The following grove should have been reported on before the O'Hara grove.

DECEMBER 27, 1929, NEW SOUTH DEVELOPMENT CO., MERRITT'S ISLAND, ZONE 1

Grove sprayed with knapsack sprayers, 14 times. Trees about 18 years old. Grove in good condition; shows very little, if any, deadwood. Grapefruit and oranges. Fruit good flavor. Valencia oranges advanced in maturity.

Respectfully submitted.

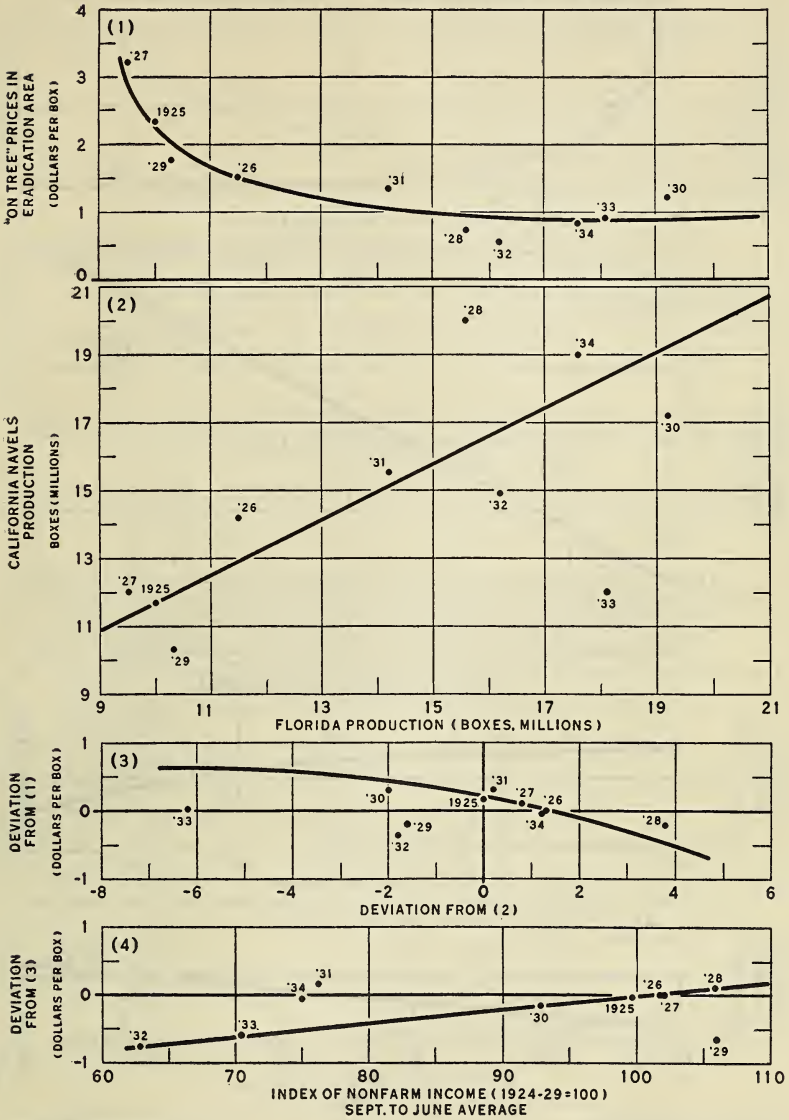
WM. L. DREW, *Chairman*.
JOHN S. TAYLOR.
RUPERT SMITH.
A. R. TRAFFORD.
S. L. HARRIS.

APPENDIX 7

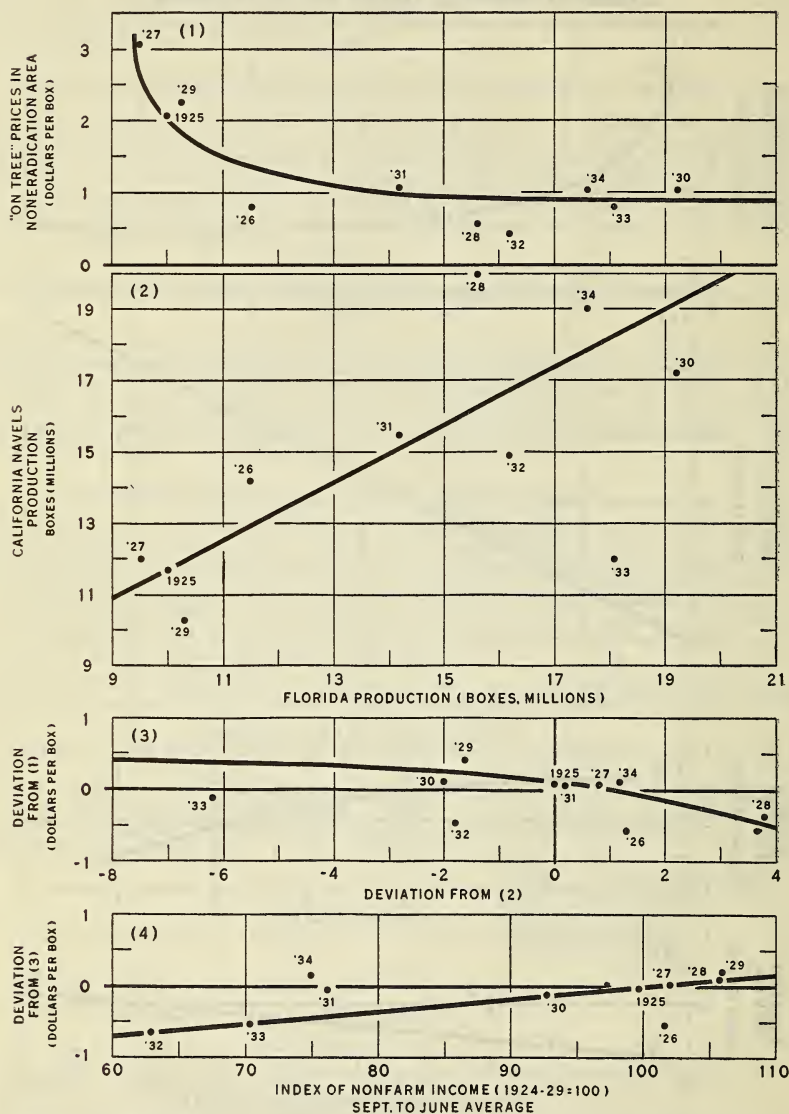
STATISTICAL CHARTS

- A. Relation of orange prices to other factors in the eradication area.
- B. Relation of orange prices to other factors in the noneradication area.
- C. Relation of grapefruit prices to other factors in the eradication area.
- D. Relation of grapefruit prices to other factors in the noneradication area.

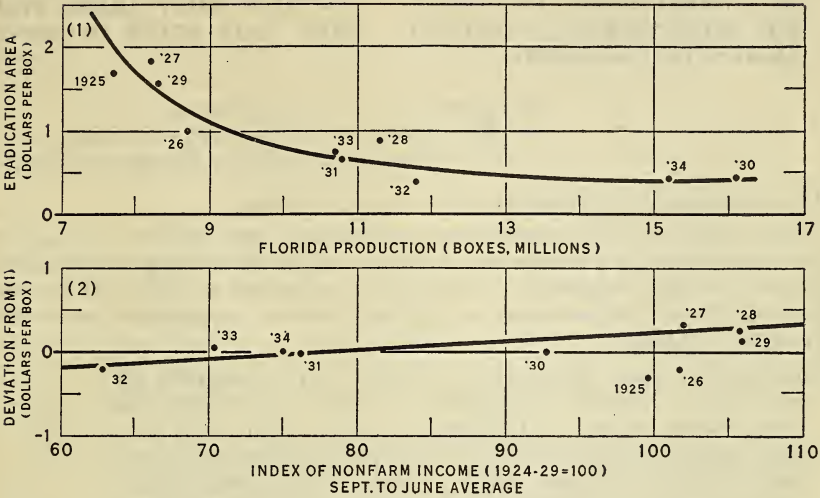
APPENDIX 7 (A), ORANGES, ERADICATION AREA, FLORIDA:
RELATION OF "ON TREE" PRICES OF PACKED FRUIT TO
OTHER FACTORS, 10 YEARS, 1925-26-1934-35



APPENDIX 7 (B). ORANGES, NONERADICATION AREA, FLORIDA:
RELATION OF "ON TREE" PRICES OF PACKED FRUIT TO
OTHER FACTORS, 10 YEARS, 1925-26-1934-35



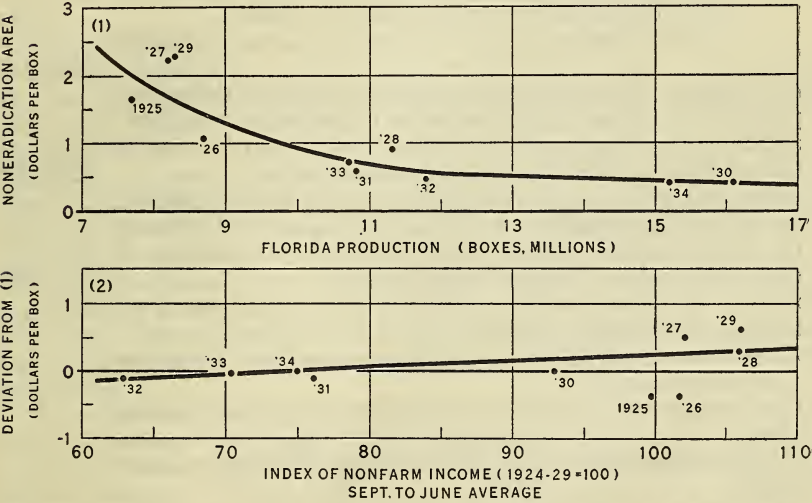
APPENDIX 7 (C), GRAPEFRUIT, ERADICATION AREA, FLORIDA:
RELATION OF "ON TREE" PRICES OF PACKED FRUIT TO
OTHER FACTORS, 10 YEARS, 1925-26-1934-35



U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF AGRICULTURAL ECONOMICS

APPENDIX 7 (D), GRAPEFRUIT, NONERADICATION AREA, FLORIDA:
RELATION OF "ON TREE" PRICES OF PACKED FRUIT TO
OTHER FACTORS, 10 YEARS, 1925-26-1934-35



U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF AGRICULTURAL ECONOMICS

MINORITY REPORT

**OPINION BY BERNARD CONNOR, MEMBER, MEDITERRANEAN FRUIT-
FLY BOARD, THAT LOSSES INCURRED BY GROWERS AND FARMERS
IN FLORIDA RESULTING FROM A CAMPAIGN THAT ERADICATED
THE MEDITERRANEAN FRUITFLY FROM THAT STATE IN 1929-30
AMOUNTED TO \$854,151**

DEPARTMENT OF AGRICULTURE,
MEDITERRANEAN FRUITFLY BOARD,
Washington, D. C., March 10, 1939.

The honorable the SECRETARY OF AGRICULTURE.

SIR: Respectfully submitted hereunder is my opinion as to the losses incurred by growers and farmers in Florida during the Mediterranean fruitfly eradication campaign conducted in 1929-30 by the United States Department of Agriculture in cooperation with the State of Florida:

Confiscation and destruction of fruit and vegetables by eradication forces (quantities of fruit and vegetables given below based on Galloway report compiled by him from daily official reports by eradication forces; and average tree price of citrus fruit as of May 1, 1929, given below, based on report of Florida State Marketing Bureau, dated Nov. 23, 1929; and average values of vegetables and non-citrus fruit, given below, based on Newell's estimates)—		
340,000 boxes of marketable fruit at an average value of \$1.10 a box.....	\$374, 000	
125,000 bushels of vegetables at an average value of \$1 a bushel.....	125, 000	
27,925 bushels of noncitrus fruit at a value of \$1 a bushel.....	27, 925	
		\$526, 925
Cost to growers in their picking up and burying of drops as a prerequisite to obtaining issuance of permits from Government for shipping fruit (total losses shown in tabulation of returned Medfly Board questionnaires).....		295, 396
Cost to growers in their furnishing private labor for applying spray, as a prerequisite to obtaining issuance of permits for shipping fruit (total losses shown by tabulation of returned Medfly Board questionnaires).....		31, 830
No losses of horses, mules, cattle, hogs, or chickens from arsenical poisoning (reasons given hereinafter).....		0
No pecuniary losses due to sterilization of fruit (reasons given hereinafter).....		0
No pecuniary losses due to spraying (reasons given hereinafter).....		0
No price losses due to any effects of the eradication campaign.....		0
Total.....		854, 151

Reasons for opinion there were no losses of horses, mules, cattle, hogs, or chickens from arsenical poisoning.—At the time of the spraying, there was a marked tendency on the part of owners in the affected area, when their animals died during the period of spraying, to blame it on the use of the arsenical spray. There has never been any proof that any animal was ever killed as a result of the spraying; in fact, all the evidence is to the contrary. As such complaints came in during the spraying, three State experiment-station veterinarians investigated and performed autopsies in all reported cases of poisoning, for a period of more than 2 months. In every case, it was found that the animals died of disease, and that the cause of death was not arsenical poisoning. Experience demonstrated that chickens could not be killed by furnishing them with no drinking water, except the standard arsenical spray mixture, over a period of 18 days. None of them even became sick.

Reasons for opinion there were no pecuniary losses due to arsenical bait spray or to sterilization of fruit.—Large amounts of losses are attributed by growers to injury to the citrus trees by use thereon of arsenical bait spray, and to damage to the quality of the fruit by arsenical bait spray or sterilization, or both. However, it is my opinion that the preponderance of the evidence shows that there were no pecuniary losses due to spraying or sterilization, for the following reasons:

Federal and State agricultural and market statistics show strikingly that unusually high prices and high net returns were obtained for the sprayed and sterilized fruit; also, that the production during the succeeding crop year of 1930-31 indicated no spray damage to fruit trees because the production was practically double that obtained during the crop season 1929-30, and greatly exceeded the crop of 1928-29 which preceded the spraying. Doctor Newell informed the Board that in 1930 he made a survey of sprayed groves for the purpose of determining the effect of the spray thereon, and found them to have benefited from the Government activities and looking better than before.

So far as production and quality of fruit in 1929-30 are concerned, production was low not only throughout Florida, in the noneradication zone as well as in the eradication zone, but was low also in other citrus-producing States. Complaints as to the poor quality of the fruit produced in Florida that season were not confined to the eradication area, but also came from the noneradication area of the State. The same type of sterilization done in Florida is at present being followed with grapefruit in such areas in Texas as may be infested, in connection with the control of the Mexican fruitfly, without deleterious effect on the quality of the fruit or loss in market price. In fact, buyers are expressing a preference for sterilized grapefruit, because sterilization treatment exposes unsound fruit, which may be culled before packing for shipment. The infestation problem in Texas is confined to grapefruit.

According to Agricultural Statistics, 1936, United States Department of Agriculture, page 131, the season average price per box received by producers in Florida for the crop of 1929-30 was \$2.75 a box for oranges, as against \$1.87 a box during 1928-29 which was the season preceding the eradication work, and \$1.88 during the succeeding season of 1930-31. For grapefruit \$2.43 a box was received in

1929-30, the season in question, as against \$1.57 a box during the preceding season of 1928-29, and \$1.20 during 1930-31.

According to the Eighth Biennial Report of the State Plant Board of Florida, February 1931, page 57, the gross revenue to Florida from the crop of 1928-29 (26,266,965 boxes) was \$56,126,267; while the gross revenue to the State for the 46 percent lower crop of 1929-30 (14,214,600 boxes), when the spraying and sterilizing were done, was \$52,757,313, or only \$3,368,954, or 6 percent, less than on the considerably larger 1928-29 crop aforementioned. More significantly the returns to the producers for the 1929-30 crop were \$16,942,604, whereas the returns to the producers for the 1928-29 crop, the year preceding the eradication work, were \$5,038,711, or an increase for the 1929-30 crop of \$11,903,893, or 136 percent.

The overwhelming weight of the testimony of the Federal and Florida State entomological and plant quarantine experts is that there was little or no damage constituting pecuniary loss due to spraying or sterilizing. On the other hand, the growers claim heavy damage particularly from spraying, but I believe their claims are due to their attributing to the spraying, damages which were really due to other factors not connected with spraying, viz, lack of fertilization, injury by common insects and diseases, heavy rains during the summer of 1929 causing an abnormally high water table in the soil, the hurricanes of 1926 and 1928, and the severe storm of 1929. Psychologically this inclination seems to have continued for a long time after the spraying in 1929, as is evidenced by the fact that the claims submitted in 1931, 2 years after the spraying, for spray damage to trees amounted to \$2,878,405, whereas in 1938, 9 years after the spraying, the growers place such loss at \$4,336,805, or an increase of 50.6 percent.

Reasons for opinion why there were no price losses due to effects of the eradication campaign.—Besides claims for losses due to sterilization or spraying, or both, losses in a large amount were claimed in the questionnaires submitted on the theory that the psychological effects of the eradication campaign caused price losses on the fruit sold. Such claimed losses are of an intangible nature, and are necessarily confined to the field of conjecture as to what additional prices might have been obtained had there been no Mediterranean fruitfly campaign. The very high prices and the large returns, aforementioned, obtained by producers during 1929-30 give no support to any theory that there was any psychological market factor resulting in a dealer or consumer discrimination against Florida fruit in general, or fruit from the eradication zone in particular. The board endeavored to approach the question from the standpoint of a statistical analysis of comparative prices as between the eradication area and the noneradication area, over a 10-year period. However, it is believed that market and economic factors so complicated the shipments and prices not only during 1929-30 but throughout the 10-year period analyzed, that any evaluation made from such comparative figures are fallacious and unsound.

In view of the poor quality of the Florida fruit in 1929-30, in the noneradication zone, where there was no infestation, as well as in the eradication zone, and the very high prices and returns obtained by the producers, it would seem that if there were any inequity in prices it was against the dealers and consumers rather than against the growers.

The following listed exhibits, not being transmitted with the majority report, are herewith transmitted with my opinion. I think they are necessary to an adequate presentation of the investigation, and as showing the viewpoints of all concerned, particularly the Florida growers and farmers. The list of exhibits follows:

(a) Report by Mr. Beverly S. Galloway on tabulation on destruction of citrus fruit, vegetables, and noncitrus fruit by eradication forces, during the Mediterranean fruitfly campaign: Part I, part II.

(b) Summary tabulation of Mediterranean Fruitfly Board questionnaires, showing losses reported by growers and farmers, by counties and types of losses, totaling \$12,147,471.55.

(c) Synopsis of activities of the Florida Growers Reimbursement Committee, March 16, 1934, giving a tabulation by counties and type of damage, of 6,017 claims submitted, totaling \$7,423,736.27.

(d) House Resolution 139, February 10, 1929, Seventy-first Congress, second session, Mediterranean fruitfly hearing conducted at Orlando, Fla., by the Special Subcommittee of the House Committee on Appropriations.

(e) Eighth Biennial Report of the State Plant Board of Florida, for the period July 1, 1928, to June 30, 1930: Section I, Mediterranean fruitfly report, pages 10-87.

(f) Agricultural statistics, United States Department of Agriculture, 1936.

Very respectfully,

BERNARD CONNOR,
Member of Mediterranean Fruitfly Board.

EXHIBIT A

DEPARTMENT OF AGRICULTURE,
PLANT QUARANTINE AND CONTROL ADMINISTRATION,
December 8, 1930.

Memorandum to Mr. Hoidale.

Herewith is furnished tabulation on destructions of Florida crops during Mediterranean fly eradication campaign.

The cards from which these tabulations were made (P. Q. C. A. Forms 719 and 723) contain property descriptions and while each card was examined during the process of compilation there was not time to arrange them properly. It is most important that some provision for casing and arranging these cards should be made as they are the only basis for accurate computation. Grouping the cards according to dates should reveal the true value of the commodities destroyed upon the basis of their current market price.

An attempted reconciliation between the figures submitted herewith and figures previously recorded in the monthly reports from Dr. Newell's office is most unsatisfactory. A reconciliation between the totals obtained from the cards and the totals obtained from the weekly reports was attempted in Polk County which comprised the whole third district. This was also unsatisfactory. Further comparisons between county totals compiled from cards and district totals compiled from weekly reports were impossible due to the grouping of portions of several counties within a single district.

On page 199 of the Mediterranean fruitfly hearing record, Dr. Newell submits a figure on citrus destruction—689,108 boxes (approximately 1½ bushels each) and continues on page 200 by saying that 350,000 of the above total was marketable.

On page 1455 of the Mediterranean fruitfly record the Secret Service agents report that the Plant Board carried an arbitrary figure of 350,000 boxes of citrus as the total destruction of this crop. Dr. Newell's statement on the stand places the total destruction of marketable citrus within approximately 12,000 boxes of the figure shown in our report. This is either a remarkable coincidence or his compilation was made from records which we have not located.

A brief summary of the compilations made from the weekly district reports is also submitted herewith (tables A-I, A-II, A-III, and A-IV). An analysis of

these data is most difficult in the face of certain errors, omissions, and almost total absence of classified detail. They are included for comparison with our report compilations headed tables I, II, III, and IV.

BEVERLY S. GALLOWAY.

PART I

TITLE I. DESTRUCTION OF FLORIDA CROPS DURING MEDITERRANEAN FRUITFLY ERADICATION CAMPAIGN

(Author, Beverly S. Galloway)

At page 199 of the record of Mediterranean fruitfly hearing Dr. Wilmon Newell states that the total destruction of Florida crops amounted to 689,108 boxes of citrus, 49,974 bushels of vegetables, and 27,393 bushels of minor and wild non-citrus fruit.

The reports from which these totals might be obtained are first, the field foreman's daily reports (P. Q. C. A. Forms 719 and 723); second, the weekly district reports; and third, the monthly reports issued by the director of the eradication campaign. After examination, the second and third of these sources were found to be irreconcilable and the daily reports were consulted to establish the totals submitted in this report.

Prior to May 6, 1929, no reliable records are available, but from this date forward to January 10, 1930, daily eradication reports are on hand. Work during the period prior to the establishment of a system of recording was in a restricted area adjacent to Orlando and while no entry has been found covering destruction of citrus in the Hamlin grove, which suggests the possibility of other unrecorded destructions in quantity, the totals here presented for Orange County should not be augmented without careful consideration of reliable estimates. This suggestion is based upon certain card records dated "April 1929" which are supposedly supplementary reports indicating destructions prior to the installation of the recording system.

While this report is based wholly upon the daily card records previously mentioned and includes no single item unsupported by such records, attention is invited to the eradication work under the direction of county agents, citizens' committees, etc. Such work accomplished considerable and although several instances point to destruction of certain commodities which were never recorded, it is probable that a large part of this independent clean-up was reported to eradication headquarters, and being so reported, is included in the totals of this summary.

It will be noted that all of the counties lying within the eradication area appear in the summary excepting Marion, Alachua, and Sumter. These areas were reported under Putnam and Lake Counties. The totals reported as "unclassified" were derived from cards listing the owner as unknown or from cards deficient in other positive means of identification.

A recapitulation of all crop destruction appears under table I.

CITRUS

For clarity citrus has been divided into five subheads: (1) Commercial, (2) non-commercial, (3) drops and culls, (4) lemon and limes and (5) kumquats. The records do not provide a division into grapefruit, oranges, and tangerines. The total entered as commercial is comprised of lots greater than 24 standard field boxes of sound fruit. On the assumption that lots of less than 25 boxes could not be picked economically or profitably, the second subhead includes those quantities of sound citrus gleaned in amounts varying from one-eighth box to 24 boxes. The third subhead is merely a summary of citrus reported as culls or drops, the latter being largely the result of the general clean-up of abandoned properties extending through the fall months to January 11, 1930. The remaining entries of limes, lemons, and kumquats are self-explanatory. The summary of citrus destruction will be found in table II.

VEGETABLES

There are no criteria incorporated in the daily records whereby vegetables may be classed as commercial and noncommercial. The totals listed are therefore composed of the positive figure presented upon each foreman's card. Hence if the amount column on the card expressed the quantity of product destroyed in acres, a translation into bushels was manifestly impossible. Bushels and acres therefore supplement each other in the tabulated report and in no instance through-

out the compilation of the report were duplicate entries of bushels and acres taken from the same card. In further explanation of the separate items of bushels and acres, attention is directed to the more adequate basic presentation of such crops as cowpeas in quantities of acres rather than bushels.

In considering all of the items listed on the foreman's cards as vegetables there are instances where none but the most exacting analysis would effect an expression of quantity. Such instances are found in entries describing the destruction of dooryard gardens a few square feet in extent containing numerous and varied articles. The sum total of such items, while representing some significance in the consideration of the owner would not appreciably affect the aggregate of vegetable destruction.

On a separate page (table V) there has been listed a summary of items destroyed which are impossible of classification and which were probably destroyed under misapprehension. While the total of these articles is negligible, it was considered desirable to present them in this report.

In effecting a reduction of quantities to the basis of bushels it was assumed that all entries reported as boxes were standard citrus field boxes capable of containing 2 bushels. Other entries were reduced on the basis of standard dry measure or according to definite comparisons derived from the card records. All cull vegetables were excluded from the totals of this report. The summarized report of vegetable destruction appears in table III.

COWPEAS

Cowpea totals tabulated under bushels cannot be classified upon any commercial basis since the field reports give no indication whether the commodity was intended for seed or cover crop. In some instances when the peas were picked the vines were disked under. In other instances the peas were picked and the vines pulled and burned. In each of these instances the value of the crop was effectually destroyed and the total of bushels is duly recorded as the result of such destruction.

In several instances the value of an acre of cowpeas has been declared by the owner and reported upon the foreman's cards. These declarations claim from \$5 to \$6 per acre. The order rescinding the requirement for destruction of cowpeas was dated June 18, 1929. Some small amounts were destroyed subsequently.

BEANS

There is no explanation to be added to the totals appearing under bushels and acres when summarizing the destruction of beans. No declared values were observed in the examination of the records.

PEPPERS

In the Orange County truck districts, reports indicated that 1 acre of peppers in full bearing yielded approximately 250 bushels. No values were cited.

TOMATOES

No basis for comment upon the totals compiled for tomatoes was derived from the records. No values were cited.

MISCELLANEOUS VEGETABLES

The three largest individual components of the totals grouped under miscellaneous vegetables were eggplants, cucumbers and squash. The greater portion of these totals, however, is comprised of lots of several vegetables obtained from garden plots and recorded under a single figure.

FRUITS

All wild fruits have been excluded from the totals of this report. With two exceptions, when the source was known to be from commercial plantings, bananas and guavas have also been excluded. These exceptions are noted on a separate page (table V) which groups together the destruction of some material that could not be classified under regular headings.

Computation in bushels was made on the same basis as that used in compiling vegetables—standard dry measure. Summary of all fruits destroyed appears in table IV.

AVOCADOS

It will be noted that the total of avocados destroyed in Pinellas County is 1,130 bushels. The records show that of this amount 906 bushels were returned to the owner after picking and were not destroyed or buried in the pits. In the absence of any further qualifying information all of this fruit was entered in the total as destroyed. No values were cited.

PERSIMMONS

This total includes Japanese persimmons alone. The value cited in several instances was \$5 per bushel.

PEACHES

No explanation is required for this entry. No value cited.

GRAPES

No explanation concerning grapes can be based upon information contained in the records. No values were cited.

MISCELLANEOUS FRUITS

The totals under miscellaneous fruits include lots of mixed fruits obtained from dooryard plantings and several other noncitrus fruits which vary with the regional source. Thus, Brevard County contributed some few bushels of mangos, Volusia, Flagler, and St. Johns Counties some figs, and the central portion of the State, pears.

None of these three products contribute an appreciable amount to the aggregate total, the major portion of which is composed of fruits listed under the headings mentioned above and entered on the records as mixed lots under a single figure.

BEVERLY GALLOWAY.

ORLANDO, FLA., December 8, 1930.

TABLE I.—*Destruction of Florida crops during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

Commercial citrus.....	boxes..	338, 727
Noncommercial citrus.....	do....	29, 433
Limes and lemons.....	do....	1, 261
Kumquats.....	do....	124
Drops and culls.....	do....	59, 523
Total, citrus.....	do....	429, 068
Cow peas (1,690 acres).....	bushels..	3, 821
Beans (190 acres).....	do....	7, 543
Peppers (196 acres).....	do....	40, 011
Tomatoes (305 acres).....	do....	25, 402
Miscellaneous vegetables (461 acres).....	do....	23, 459
Total, vegetables.....	do....	100, 236
Total, acres.....		2, 842
Peaches (7 acres).....	bushels..	1, 528
Miscellaneous fruit (3 acres).....	do....	4, 497
Avocados (1 acre).....	do....	1, 903
Persimmons.....	do....	2, 132
Grapes.....	do....	4, 448
Total, noncitrus fruits.....	do....	14, 508
Total, acres.....		11

TABLE II.—*Destruction of citrus by counties during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

County	Commercial lots	Noncommercial lots	Limes, lemons	Kumquats	Drops and culls	Total
Brevard.....	9,859	1,288	98	1	832	12,078
Citrus and Levy.....		35			57	92
Flagler.....		14			3	17
Hernando.....	1,150	15			220	1,385
Hillsborough.....	1,516	1,623	32	2	2,184	5,357
Lake.....	32,535	3,982	332	18	3,130	39,997
Osceola.....	8,845	996	91		353	10,285
Orange.....	152,718	7,811	268	60	3,227	164,084
Pasco.....	133	133		34	692	992
Pinellas.....	520	1,780	49		8,032	10,381
Polk.....	24,796	4,173	90	5	1,771	30,835
Putnam.....	7,378	690	4		1,111	9,183
St. Johns.....	30	75			40	145
Seminole.....	13,802	1,243			1,926	16,971
Volusia.....	71,680	3,180	4	2	3,370	78,236
Unclassified.....	13,765	2,395	293	2	32,575	49,030
Total, boxes.....	338,727	29,433	1,261	124	59,523	429,068

TABLE IV.—*Destruction of noncitrus fruits by counties during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

County	Avocados		Persimmons		Peaches		Grapes		Miscellaneous fruits		Total	
	<i>Bush.</i>	<i>Acres</i>	<i>Bush.</i>	<i>Acres</i>	<i>Bush.</i>	<i>Acres</i>	<i>Bush.</i>	<i>Acres</i>	<i>Bush.</i>	<i>Acres</i>	<i>Bush.</i>	<i>Acres</i>
Brevard.....	83		16		147		83		421		750	
Citrus and Levy.....			4		5		10		28		47	
Flagler.....					1		16				17	
Hernando.....		1	2		4		2		52		60	
Hillsborough.....	120		39		17		80		44		300	
Lake.....			224		162		610		586	1	1,582	1
Osceola.....	4		12		133		29		4		182	
Orange.....	92		175		209	7	877		203		1,556	7
Pasco.....			2						1		3	
Pinellas.....	1,130		7		14		30		105		1,286	
Polk.....	64		34		44		31		295		468	
Putnam.....	1		41		166		190		137		535	
St. Johns.....	9		266		96		992		956		2,319	
Seminole.....			136		147		175		117		575	
Volusia.....	321		1,100		345		1,102		1,235	2	4,103	2
Unclassified.....	79		74		38		221		313		725	
Total.....	1,903	1	2,132		1,528	7	4,448		4,497		314,508	11

TABLE V.—*Some additional entries*

Strawberries:		
Plants.....	individuals..	20,000
Acres.....		20
Fruits and plants.....	bushels..	260
Fruit.....	quarts.....	392
Potatoes.....	acres.....	2
Potatoes and corn.....	do.....	3
Potatoes, corn, okra, and collard greens.....	do.....	7
Corn.....	do.....	3
Collard greens.....	do.....	4
Cabbage.....	bushels.....	14
Blackberries.....	acres.....	2
Bananas.....	bunches.....	1,715
Cotton.....	row.....	1
Miscellaneous fruits.....	acres.....	8
Guavas.....	bushels.....	38
Guavas.....	acres.....	4

82 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

TABLE A-I.—*Destruction of Florida crops during the Mediterranean fruitfly eradication campaign, as reported weekly, from districts—May 1929 to Jan. 11, 1930*

Citrus reported as being from active zones 1.....boxes.. 490, 910
 Citrus reported as being from eradication area.....do.... 25, 906

Total, citrus.....do.... 516, 816
 Total vegetables reported from active zones 1.....bushels.. 42, 109
 Total noncitrus fruits reported from active zones 1.....do.... 27, 925

TABLE A-II.—*Destruction of citrus during the Mediterranean fruitfly eradication campaign, by districts May 1929 to Jan. 11, 1930, as reported weekly*

Counties	Total of each week's entry by districts				Final totals shown for each district		
	District No. —	Carried as active zones 1	Carried as eradication area	Total	Carried as active zones 1	Carried as eradication area	Total
Orange, South Lake and Osceola.....	1	9, 583	7, 322	16, 905	333, 062	8, 898	341, 960
Brevard.....	2	1, 892	1, 179	3, 071	20, 719	1, 561	22, 280
Polk.....	3	9, 897	3, 928	13, 825	14, 312	5, 065	19, 377
Lake and Sumter.....	4	1, 095	1, 405	2, 500	1, 875	1, 408	3, 283
Seminole.....	5	1, 420	386	1, 806	1, 420	464	1, 884
West Volusia and east Putnam.....	6	3, 226	322	3, 548	95, 762	425	96, 187
East Volusia.....	7	565	522	1, 087	3, 987	522	4, 509
St. Johns, Flagler, and Duval.....	8	424	-----	424	135	-----	135
Jacksonville.....	9	-----	-----	-----	-----	-----	-----
Pinellas.....	10	14, 103	4, 753	18, 856	13, 825	5, 437	19, 262
Pinellas and Pasco.....	10A	1, 512	-----	1, 512	1, 956	-----	1, 956
Hillsborough.....	11	2, 573	716	3, 289	2, 609	860	3, 469
Alachua and Putnam.....	11A	61	-----	61	60	-----	60
Marion, Putnam, and Alachua.....	12	18	-----	18	51	-----	51
Tampa.....	13	362	-----	362	443	-----	443
Levy, Gilchrist, Dixie, Taylor and Lafayette.....	14	131	21	152	109	21	130
Gilchrist, Dixie, Taylor, and Lafayette.....	14A	8	-----	8	8	-----	8
Hernando and Citrus.....	15	19	-----	19	28	-----	28
Pasco.....	15A	475	-----	475	513	-----	513
Marion.....	22	36	1, 145	1, 181	36	1, 245	1, 281
Total, boxes.....	-----	47, 400	21, 699	69, 099	490, 910	25, 906	516, 816

TABLE A-III.—*Destruction of vegetables during the Mediterranean fruitfly eradication campaign by districts—May 1929 to Jan. 11, 1930, as reported weekly*

Counties	District No. —	Totals of each week's entry, by districts	Final total shown for each district
Orange, South Lake and Osceola.....	1	32, 540	32, 540
Brevard.....	2	11	1, 029
Polk.....	3	1, 011	906
Lake and Sumter.....	4	159	561
Seminole.....	5	916	916
West Volusia and east Putnam.....	6	-----	-----
East Volusia.....	7	45	981
St. Johns, Flagler, and Duval.....	8	2, 640	3, 606
Jacksonville.....	9	-----	-----
Pinellas.....	10	444	650
Pinellas and Pasco.....	10A	7	154
Hillsborough.....	11	8	70
Alachua and Putnam.....	11A	381	329
Marion, Putnam, and Alachua.....	12	30	147
Tampa.....	13	281	158
Levy, Gilchrist, Dixie, Taylor, and Lafayette.....	14	158	12
Gilchrist, Dixie, Taylor, and Lafayette.....	14A	12	-----
Hernando and Citrus.....	15	-----	-----
Pasco.....	15A	33	37
Marion.....	22	-----	-----

Total (of weekly entries for all districts).....bushels.. 38, 626
 Total (of final entries shown for all districts).....do.... 42, 109

TABLE A-IV.—*Destruction of noncitrus fruits during the Mediterranean fruitfly eradication campaign, by districts, May 1929 to Jan. 11, 1930, as reported weekly*

Counties	District No.—	Totals of each week's entry, by districts	Final total shown for each district
Orange, South Lake and Osceola.....	1	10, 588	9, 752
Brevard.....	2	677	1, 298
Polk.....	3	431	347
Lake and Sumter.....	4	2, 274	403
Seminole.....	5	4, 594	4, 577
West Volusia and East Putnam.....	6	160	144
East Volusia.....	7	253	3, 023
St. Johns, Flagler, and Duval.....	8		
Jacksonville.....	9		
Pinellas.....	10	3, 175	5, 069
Pinellas and Pasco.....	10A	381	1, 358
Hillsborough.....	11	51	13
Alachua and Putnam.....	11A	10	10
Marion, Putnam, and Alachua.....	12	195	473
Tampa.....	13	1, 200	941
Levy, Gilchrist, Dixie, Taylor, and Lafayette.....	14	257	236
Hernando and Citrus.....	15	1, 457	131
Pasco.....	15A	150	142
Marion.....	22	8	8

Total (of weekly entries for all districts).....bushels.. 25, 861
 Total (of final entries shown for all districts).....do..... 27, 925

PART II

DEPARTMENT OF AGRICULTURE,
 PLANT QUARANTINE AND CONTROL ADMINISTRATION,
 Orlando, Fla., December 17, 1930.

TITLE 2. CITRUS DESTRUCTION IN FLORIDA DURING MEDITERRANEAN FRUITFLY
 ERADICATION CAMPAIGN, 1929-30

(Author, Beverly S. Galloway)

In a memorandum dated December 8, 1930, dealing with crop destruction during the Mediterranean fruitfly eradication campaign certain discrepancies between the totals of citrus tabulated in tables II and A-II (exhibit I) were mentioned. Those totals appearing in table II were obtained from records purporting to be a daily account of the progress of eradication as reported directly by the field foreman. The totals listed in table A-II were compiled from weekly reports originating in the several district field headquarters. The following material is offered for consideration in conjunction with the memorandum and tabulations mentioned above.

In reviewing the various aspects of the results of the Mediterranean fly eradication campaign upon the destruction of citrus it is well to consider certain phases of the Florida citrus season 1928-29 as a whole.

Mr. H. Harold Hume, a recognized authority upon Florida citrus, speaking at Gainesville on August 13, 1929, stated that "Last year's crop of citrus fruits, totaling approximately 27,000,000 boxes, was one of the largest on record." (The monthly Bulletin of the State Plant Board of Florida, August 1929, vol. XIV; No. 2, p. 33). While there is adequate basis for believing that a crop of such proportions was promised by the conditions prevailing during early August of 1928, the fulfilment of this promise met reverses in the storms experienced during August and September 1928.

H. F. Willson, of the Bureau of Agricultural Economics, writing in the Market News Service on Fruits and Vegetables, Florida Citrus Summary of 1928-29 Season, states that "aside from the storms of August and September the early seasonal growing conditions were good. All early estimates both Government and commercial were less than the actual production. When the local office was closed May 25, the actual shipments for the entire State to date were * * * a grand total of 61,523 cars. Figuring on the basis of 360 boxes to the car the

results would be 22,038,840 boxes exclusive of less than carload express, and truck movement."

The season's total movement actually reached the sum of 63,460 cars or 22,845,600 boxes on a basis of 360 boxes to the car. Estimates as to the amount of fruit destroyed by storms runs as high as 5,000,000 boxes but it is probable that 3,000,000 would be more nearly correct. On the basis of the succeeding season's figures the aggregate total of citrus destined for canning purposes and local consumption would reach 2,610,000 boxes. The total crop, exclusive of the storm damage, thus appears at 25,455,600 boxes. If the estimate of 3,000,000 boxes destroyed by the storm is reliable the total possible crop would have been 28,455,600 boxes or 79,043 cars. This figure would exceed the previous maximum record of 55,829 (exhibit II) cars moved during 1923-24 by 23,214 cars. Assuming that these two seasons represent comparable maximums in potential production, the increase is approximately 41 percent.

Based upon the figures cited above and upon the component parts of the totals those figures represent, there should be some indication as to the probable citrus-crop remnant which was destroyed during the eradication campaign.

There are available at the present time three different grand totals purporting to represent the amount of citrus destroyed during the eradication campaign. The first and largest of these totals was announced by Dr. Newell while testifying before the House investigating committee was 689,108 boxes of 1½ bushels capacity (packed boxes). The second total—obtained from current reports of the progress of the campaign compiled in the office of Dr. A. F. Camp, in charge of clean-up work—sets the amount at 516,816 boxes (table A-II, exhibit I). It is assumed that since this figure emanates from the field force the quantum "boxes" is intended to express field boxes which contain approximately three-tenths of a bushel more than a packing box. Thus, by converting the total of 516,816 field boxes to packed boxes, this second figure would aggregate 661,860 boxes of 1½ bushels capacity; a discrepancy of 27,248 boxes of 1½ bushels capacity between the two grand totals. The third figure was presented in a memorandum dated December 8, 1930, as a result of a compilation made from the daily field records (May 1929 to January 1930) filed in Orlando. This figure presented 429,068 field boxes as the sum of citrus destruction (table II, exhibit I), which, upon conversion, would equal 557,788 packed boxes.

The immediate concern when considering destruction of citrus during the campaign is the amount of the 1928-29 crop destroyed. Obviously, with but one infestation found subsequent to August during 1929, destruction of marketable fruit during the fall months was negligible. The three grand totals mentioned in the preceding paragraph cover a period extending, respectively, to December 31, 1929, January 11, 1930, and January 11, 1930, and therefore include certain amounts of the 1929-30 crop. All of these amounts were composed of drops and windfalls.

Considering the proportionate amount of drops and marketable fruit in the first total mentioned by Dr. Newell—689,108 boxes—it is to be supposed from his qualifying statement that while 350,000 boxes was the approximate quantity of marketable fruit destroyed, the balance, or approximately 340,000 boxes, was composed of culls of the 1928-29 crop and drops of the 1929-30 crop. If the figures presented by the district reports are correct, a total of approximately 26,000 boxes was gleaned as drops from abandoned and uncared for properties during November and December of 1929 and 10 days of January 1930. Thus approximately 314,000 boxes of unmarketable fruit would have been destroyed with the 350,000 boxes of good fruit existing as the remnant of the 1928-29 crop.

The second total—516,816 boxes—is divided by the reports into 25,906 boxes of zone II drops and 490,910 boxes from the eradication area (table A-II, exhibit I). It is believed that the total of 25,906 boxes of drops is too low because first—the initial report upon such destruction is dated November 9, 1929, and second; during the compilation of the tables which established the third grand total mentioned a series of records which had obviously never been indexed were examined and revealed a total of 32,575 boxes of drops. This figure appears under "Drops and culls, unclassified," table II, exhibit I. The total for drops and culls as reported in the above memorandum was 59,523 boxes.

The third grand total was composed of five integral parts, three of which dealt with presumably commercial citrus and two of which dealt with noncommercial; the former aggregated 340,112 boxes and the latter 88,956 boxes (table II, exhibit I).

The major differences between the three grand totals may now be tabulated graphically:

	Commer- cial	Noncom- mercial	Total
Dr. Newell's.....	350, 000	339, 108	689, 108
Table A-II.....	490, 910	25, 906	516, 816
Table II.....	340, 112	88, 956	429, 068

While the greatest discrepancies appear in the above tabulation under "Non-commercial," interest is centered in the totals of commercial citrus—or the 1928–29 crop remnant destroyed. Since there is no series of computations through which the first total may be analyzed, the second and third sums must be compared to discover the essential points at variance.

The leading citrus producing counties of the State are Polk, Orange, Lake, Pinellas, Hillsborough, and Volusia in the order named (exhibit III). The counties which suffered the greatest losses of citrus according to table II in the memorandum of December 8, 1930, were Orange, Volusia, Lake, Polk, and Seminole in the order listed. This latter order also prevails in the number of infestations discovered prior to June 30, 1929.

A comparison of tables II and A-II of exhibit I, will reveal that the aggregates for Volusia, Lake, Polk, and Seminole are not at variance to a great degree. The essential difference noted in the comparison of these two tables lies in the sums entered against Orange County. This difference amounts to approximately 150,000 boxes, which, if accounted for, would practically reconcile the second and third totals tabulated on page 5 (*supra*) as "Commercial citrus."

Over a period of 6 years, covering the seasons 1923–24 to 1929–30, inclusive, but excepting the season 1925–26, for which complete figures are not available, Orange County has moved an average of 6,153.6 cars per year (exhibit IVa). This amount represents an average of 12.66 percent of the annual total State citrus crop (exhibit IVb). The peak movement from Orange County prior to the season 1928–29 reached 7,039 cars in 1923–24. This figure represented 12.57 percent of the State's crop of 55,829 cars reported for that season. Prior to 1928–29 the highest percentage of the season's total crop was moved from Orange County in 1926–27—13.98 percent. The movement from Orange County in 1923–24 was the lightest in proportion to the season's total—12.57 percent as already cited. On the basis of citrus moved from the State, the Orange County total of 8,339 cars for 1928–29 represents 13.14 percent of the aggregate total.

On the basis of percentage of movement it may be said that Orange County has shipped each season for 6 years a part of the State total, which varies within positive limits of 1.4 percent.

The movement of citrus during the spring of 1929 was not restricted until the 15th of April. In this month of April, Orange County had, in previous seasons, shipped as high as 2.02 percent of the total annual State crop and as low as 0.85 percent; the average being 1.45 percent. During May, Orange County had, in previous seasons shipped as high as 0.8 percent and as low as 0.3 percent of the annual State crop; the average being 0.5 percent. The average shipments for June originating in Orange County are 0.01 percent. The average aggregates for the 3 months of April, May, and June shipped from Orange County represent 1.98 percent of each season's total crop (exhibit IVb).

While none of these figures form a basis for a positive mathematical formula capable of proving that Orange County was limited to a definite production of citrus, they may be used to derive certain indicative facts:

	April	May	June	Total
	Percent	Percent	Percent	Percent
Average, 5 years.....	1.45	0.05	0.01	1.98
1929.....	2.16	.09	-----	2.25

From the above tabulation it would appear that though there was a deficit below the average movement during May and June of 1929, the excess during April contrived to bring the aggregate for 3 months above the average.

The records of citrus movement show that Orange County shipped 8,339 cars during the season 1928–29. This amount is 1,300 cars in excess of the previous record of 7,039 established in 1923–24 (exhibit IVc). If the relation of Orange County production to State production in 1923–24 is the same as that in 1928–29, then by virtue of the average of 12.66 percent, representing Orange County's

contribution to the seasonal crop, the 1928-29 total for the county should, on a basis of 25,000,000 boxes approximate 8,800 cars, or within 16 cars of a total obtained by adding the car equivalent (445 cars) of 160,000 boxes recorded as destroyed (table II, exhibit I) to the sum (8,339 cars) already noted as shipped.

While the foregoing is not offered as irrefutable proof that an additional approximate 425 cars or 150,000 boxes of citrus could not have existed in Orange County in May and June of 1929 it seems amply indicative in the face of the fact that shipments during the months in question had never exceeded 500 cars, or a maximum of 0.8 percent of the seasonal total, and that the report representing the destruction of citrus in Orange County at such a high figure appears in the eradication district reports for the first time on August 17, 1929, and is apparently an estimate.

It is therefore probable that the totals listed in table II in the memorandum of December 8, 1930, need no revision.

BEVERLY S. GALLOWAY.

ORLANDO, FLA., December 17, 1930.

EXHIBIT I

TABLE II.—*Destruction of citrus by counties during the Mediterranean fruitfly eradication campaign, April 1929 to Jan. 11, 1930*

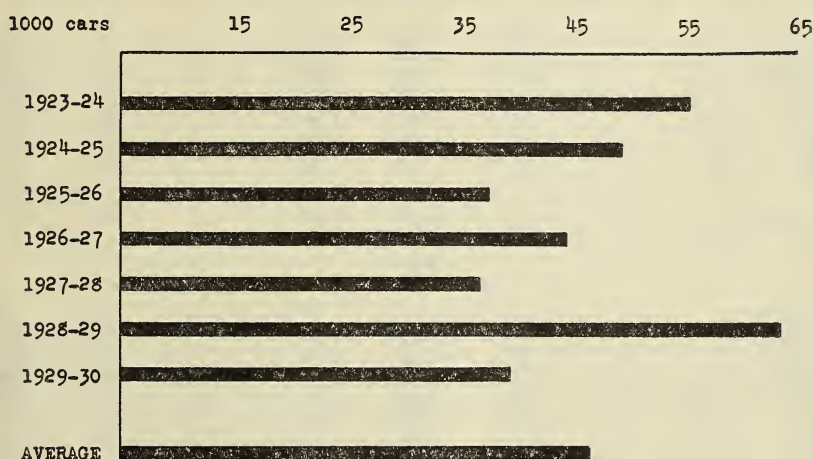
	Commer- cial lots	Noncom- mercial lots	Limes, lemons	Kumquats	Drops and culls	Total
Brevard.....	9,859	1,288	98	1	832	12,078
Citrus and Levy.....		35			57	92
Flagler.....		14			3	17
Hernando.....	1,150	15			220	1,385
Hillsborough.....	1,516	1,623	32	2	2,184	5,357
Lake.....	32,535	3,982	332	18	3,130	39,997
Osceola.....	8,845	996	91		3,353	10,285
Orange.....	152,718	7,811	268	60	3,227	164,084
Pasco.....	133	133		34	692	992
Pinellas.....	520	1,780	49		8,082	10,381
Polk.....	24,796	4,173	90	5	1,771	30,835
Putnam.....	7,378	690	4		1,111	9,183
St. Johns.....	30	75			40	145
Seminole.....	13,802	1,243			1,926	16,971
Volusia.....	71,680	3,180	4	2	3,370	78,236
Unclassified.....	13,765	2,395	293	2	32,575	49,030
Total boxes.....	338,727	29,433	1,261	124	59,523	429,068

TABLE A-II.—*Destruction of citrus during the Mediterranean fruitfly eradication campaign, by districts May 1929 to Jan. 11, 1930, as reported weekly*

Counties	Total of each week's entry by districts				Final totals shown for each district		
	District No.	Carried as active zones 1	Carried as eradication area	Total	Carried as active zones 1	Carried as eradication area	Total
Orange, South Lake, and Osceola....	1	9,583	7,322	16,905	333,062	8,898	341,960
Brevard.....	2	1,892	1,179	3,071	20,719	1,561	22,280
Polk.....	3	9,897	3,928	13,825	14,312	5,065	19,377
Lake and Sumter.....	4	1,095	1,405	2,500	1,875	1,408	3,283
Seminole.....	5	1,420	386	1,806	1,420	464	1,884
West Volusia and east Putnam.....	6	3,226	322	3,548	95,762	425	96,187
East Volusia.....	7	565	522	1,087	3,987	522	4,509
St. Johns, Flagler, and Duval.....	8	424		424	135		135
Jacksonville.....	9						
Pinellas.....	10	14,103	4,753	18,856	13,825	5,437	19,262
Pinellas and Pasco.....	10A	1,512		1,512	1,956		1,956
Hillsborough.....	11	2,573	716	3,289	2,609	860	3,469
Alachua and Putnam.....	11A	61		61	60		60
Marion, Putnam, and Alachua.....	12	18		18	51		51
Tampa.....	13	362		362	443		443
Levy, Gilchrist, Dixie, Taylor, and Lafayette.....	14	131	21	152	109	21	130
Gilchrist, Dixie, Taylor, and Lafayette.....	14A	8		8	8		8
Hernando and Citrus.....	15	19		19	28		28
Pasco.....	15A	475		475	513		513
Marion.....	22	36	1,145	1,181	36	1,245	1,281
Total boxes.....		47,400	21,699	69,099	490,910	25,906	516,816

EXHIBIT II.—*Total monthly movement of citrus from Florida, 1923-30*

Month	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30	Total	Average
August.....							10	10	1.4
September.....	468	13	62	20	198	94	551	1,406	200.8
October.....	3,210	1,975	1,394	1,142	2,714	3,315	2,443	16,193	2,313.2
November.....	9,095	7,393	4,720	6,600	5,965	6,865	4,885	45,523	6,503.2
December.....	7,261	8,425	6,882	8,125	7,171	8,744	7,485	54,093	7,727.5
January.....	7,029	8,883	5,820	7,100	5,991	9,774	8,057	52,654	7,522.0
February.....	7,812	8,289	5,103	7,233	4,772	9,259	7,194	49,662	7,094.5
March.....	8,551	6,003	6,515	6,352	4,797	8,928	6,286	47,432	6,776.0
April.....	6,859	5,517	4,486	5,229	3,077	9,198	2,513	36,879	5,268.4
May.....	4,532	2,305	1,720	2,670	1,718	6,063	30	19,038	2,719.7
June.....	1,012	376	341	454	321	1,192	28	3,724	532.0
July.....		4			32	18	3	57	8.1
August.....						10		10	1.4
Total.....	55,829	49,183	37,043	44,925	36,756	63,460	39,485	326,681	46,668.7

EXHIBIT IIB.—*Yearly shipments of citrus from Florida, carloads*

Season	Oranges	Grapefruit	Tangerines	Mixed	Total
1923-24.....	32,617	19,128	544	3,540	55,829
1924-25.....	25,016	19,963		4,204	49,183
1925-26.....	19,755	14,214		3,074	37,043
1926-27.....	22,400	17,258		5,267	44,925
1927-28.....	16,450	14,108		6,198	36,756
1928-29.....	32,475	21,837		9,148	63,460
1929-30.....	16,475	13,950	843	8,217	39,485
Grand total.....	165,188	120,458	1,387	39,648	326,681
Average, 7 years.....	23,598	17,208		5,664	46,668

EXHIBIT IIC.—*Percentage of varietal classification by season, 1923-30*

Season	Oranges	Grapefruit	Mixed	Tangerines
1923-24.....	58.42	34.26	6.34	0.97
1924-25.....	50.86	40.59	8.54	
1925-26.....	53.32	38.37	8.29	
1926-27.....	49.86	38.41	11.72	
1927-28.....	44.75	38.38	16.86	
1928-29.....	51.17	34.41	14.41	
1929-30.....	41.72	35.33	20.81	2.18

EXHIBIT IId. *Monthly movement of citrus from Florida*

1923-24

Month	Oranges	Grapefruit	Tangerines	Mixed	Total
September.....	23	443	-----	2	468
October.....	1,091	1,992	-----	127	3,210
November.....	6,051	2,482	122	440	9,095
December.....	4,995	1,573	167	526	7,261
January.....	3,991	2,409	205	424	7,029
February.....	4,630	2,639	43	500	7,812
March.....	5,279	2,748	7	517	8,551
April.....	4,187	2,081	-----	591	6,859
May.....	1,929	2,255	-----	348	4,532
June.....	441	506	-----	65	1,012
July.....	-----	-----	-----	-----	-----
Total.....	32,617	19,128	544	3,540	55,829

1924-25

September.....	-----	13	-----	-----	13
October.....	245	1,690	-----	40	1,975
November.....	4,269	2,626	-----	498	7,393
December.....	5,749	1,684	-----	992	8,425
January.....	5,265	2,646	-----	972	8,883
February.....	4,220	3,382	-----	687	8,289
March.....	2,642	2,841	-----	520	6,003
April.....	1,684	3,508	-----	325	5,517
May.....	825	1,339	-----	141	2,305
June.....	117	280	-----	29	376
July.....	-----	4	-----	-----	4
Total.....	25,016	19,963	-----	4,204	49,183

1925-26

September.....	-----	54	-----	8	62
October.....	445	869	-----	80	1,394
November.....	2,596	1,847	-----	277	4,720
December.....	4,303	2,000	-----	579	6,882
January.....	3,047	2,179	-----	594	5,820
February.....	2,651	1,865	-----	587	5,103
March.....	3,336	2,689	-----	490	6,515
April.....	2,578	1,535	-----	373	4,486
May.....	686	955	-----	79	1,720
June.....	113	221	-----	7	341
July.....	-----	-----	-----	-----	-----
Total.....	19,755	14,214	-----	3,074	37,043

1926-27

September.....	-----	20	-----	-----	20
October.....	525	533	-----	84	1,142
November.....	3,073	2,810	-----	717	6,600
December.....	5,225	1,741	-----	1,159	8,125
January.....	3,811	2,569	-----	720	7,100
February.....	3,969	2,405	-----	859	7,233
March.....	2,742	2,888	-----	722	6,352
April.....	2,074	2,500	-----	655	5,229
May.....	819	1,564	-----	287	2,670
June.....	162	228	-----	64	454
July.....	-----	-----	-----	-----	-----
Total.....	22,400	17,258	-----	5,267	44,925

EXHIBIT IID. *Monthly movement of citrus from Florida—Continued*

1927-28

Month	Oranges	Grapefruit	Tangerines	Mixed	Total
September.....	6	188	-----	4	198
October.....	834	1,485	-----	395	2,714
November.....	2,953	1,924	-----	1,088	5,965
December.....	4,174	1,485	-----	1,512	7,171
January.....	3,145	1,881	-----	965	5,991
February.....	1,987	1,948	-----	837	4,772
March.....	1,866	2,181	-----	750	4,797
April.....	1,049	1,631	-----	397	3,077
May.....	410	1,083	-----	225	1,718
June.....	26	270	-----	25	321
July.....	-----	32	-----	-----	32
Total.....	16,450	14,108	-----	6,198	36,756

1928-29

September.....	5	88	-----	1	94
October.....	890	2,088	-----	337	3,315
November.....	3,735	2,173	-----	957	6,865
December.....	5,025	2,190	-----	1,529	8,744
January.....	5,390	2,877	-----	1,507	9,774
February.....	4,797	3,010	-----	1,452	9,259
March.....	4,436	3,206	-----	1,286	8,928
April.....	4,441	3,493	-----	1,264	9,198
May.....	2,977	2,458	-----	628	6,063
June.....	757	251	-----	184	1,192
July.....	16	1	-----	1	18
August.....	6	2	-----	2	10
Total.....	32,475	21,837	-----	9,148	63,460

1929-30

August.....	6	2	-----	2	10
September.....	5	545	-----	1	551
October.....	266	1,999	9	169	2,443
November.....	2,117	1,568	195	1,005	4,885
December.....	3,564	1,455	396	2,070	7,485
January.....	3,645	2,262	222	1,928	8,057
February.....	3,480	2,178	19	1,517	7,194
March.....	2,594	2,551	2	1,139	6,286
April.....	789	1,341	-----	383	2,513
May.....	6	21	-----	3	30
June.....	3	25	-----	-----	28
July.....	-----	3	-----	-----	3
Total.....	16,475	13,950	843	8,217	39,485

EXHIBIT III.—Shipments of citrus by carloads from counties, 1923-30

County	1923-24	1924-25	1925-26	1926-27	1927-28	1928-29	1929-30	Total	Average
Alachua	188	183	52	200	133	240	204	1,200	171
Baker							1	1	
Bay				1			5	6	
Bradford	1				2			3	
Brevard	1,720	1,686	1,859	1,746	1,761	2,550	1,178	12,500	1,785
Broward	55	55	20					130	18
Charlotte	90	48	7	1		20	1	167	23
Citrus	37	38	16	45	3	26	5	170	24
Clay		1						1	
Collier					1			1	
Dade	974	1,289	851	2	390	497	198	4,201	600
DeSoto	3,205	1,855	1,500	763	664	2,145	1,232	11,364	1,623
Duval	1,008							1,008	
Escambia	1						16	17	2
Flagler	1	16	58	18	17	64	30	204	29
Glades		3	22					25	3
Hardee	2,537	1,619	1,486	1,595	977	1,749	958	10,921	1,560
Hendry						5	23	28	4
Hernando	388	374	173	311	196	392	195	2,029	289
Highlands	612	875	394	699	921	1,118	977	5,596	799
Hillsboro	3,042	2,869	1,653	2,667	1,461	3,196	1,632	16,520	2,360
Indian River			541	988	820	540	674	3,563	713
Jackson							34	34	
Lake	4,899	4,617	2,980	4,460	2,615	5,701	2,733	28,005	4,000
Lee	1,806	1,078	1,169	266	417	1,416	904	7,056	1,008
Manatee	2,879	1,992	1,560	1,531	1,368	2,756	1,640	13,726	1,960
Marion	1,603	1,358	972	1,462	1,021	2,074	1,040	9,530	1,361
Martin			2	1				3	
Monroe		2						2	
Okeechobee	30	51		35	45	2	13	176	25
Orange	7,039	6,391	4,765	6,283	4,749	8,339	4,121	41,687	5,955
Osceola	485	416	313	351	212	497	184	2,458	351
Palm Beach	24	8	23	9	4			68	9
Pasco	591	581	301	447	321	1,205	647	4,093	584
Pinellas	3,528	3,362	2,736	2,493	2,411	4,220	3,349	22,099	3,157
Polk	12,808	12,550	8,166	13,307	12,277	17,347	13,073	89,528	12,789
Putnam	1,030	983	747	844	436	1,275	589	5,904	843
St. Johns	25	20	10	31	34	62	34	216	30
St. Lucie	1,614	1,576	946	527	1,050	373	1,038	7,124	1,017
Santa Rosa							1	1	
Sarasota	250	146	54	25	41	149	70	735	105
Seminole	755	834	689	1,206	572	1,468	590	6,114	873
Sumter	135	117	35	88	36	151	107	669	95
Volusia	2,467	1,885	2,068	2,362	1,652	3,180	1,313	14,927	2,138
Washington								2	
Pick-ups			856	33			421	1,310	
Boat loads		305	19	128	149	703	254	1,558	222
Total	55,829	49,183	37,043	44,925	36,756	63,460	39,485	326,681	

NOTE.—The total for 1928-29 includes 1 car from Jefferson County.

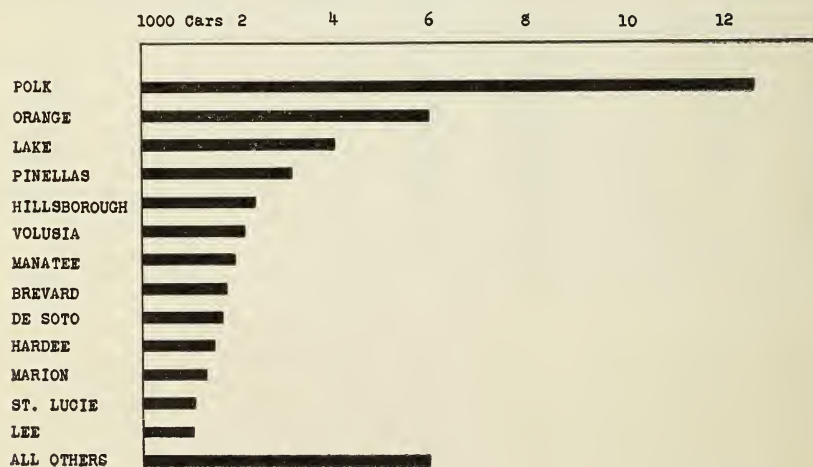


EXHIBIT IVA. *Shipments from Orange County, by month and year, 1923-30*

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1923-24.....	2	217	1,142	970	904	1,124	1,270	935	452	23	1,039
1924-25.....		135	1,031	1,291	1,272	1,110	773	628	149	2	6,391
1925-26 ¹											4,765
1926-27.....		110	740	1,114	994	1,018	1,100	910	291	6	6,283
1927-28.....		170	721	1,095	923	729	676	315	113	7	4,749
1928-29.....		161	750	1,245	1,674	1,625	1,546	1,375	63		8,339
1929-30.....		141	517	963	1,071	851	514	64			4,121
Average.....	.33	155.6	816.8	1,113	1,123	1,076.1	979.8	704.5	178	6.3	6,153.6

¹ Monthly shipments not available.EXHIBIT IVB. *Monthly and yearly percentages of Orange County, as compared to total State movement*

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1923-24.....	.005	.388	2.04	1.73	1.61	2.01	2.27	1.67	.809	.04	12.57
1924-25.....		.27	2.09	2.62	2.58	2.25	1.57	1.27	.30	.004	12.95
1926-27.....		.24	1.64	2.47	2.21	2.26	2.44	2.02	.64	.01	13.98
1927-28.....		.46	1.96	2.97	2.51	1.98	1.83	.85	.30	.019	12.92
1928-29.....		.25	1.18	1.96	2.48	2.56	2.43	2.16	.099		13.14
1929-30.....		.35	1.30	2.43	2.71	2.15	1.30	.16			10.40
Average.....		.325	1.70	2.363	2.35	2.20	1.97	1.35	.358	.01	12.66

1000 Cars

4

5

6

7

8

1923-24

1924-25

1925-26

1926-27

1927-28

1928-29

1929-30

192..

Mr. _____,

at _____

in order to assist in clearing up the infestation of Mediterranean fruitfly hereby gives permission to the Florida State Plant Board to destroy any and all citrus and other host fruits of Mediterranean fruitfly found on his property.

Signed _____

192..

_____ of _____, Florida hereby requests the Florida State Plant Board to destroy any and all plants, trees, or shrubs on his property, that may in the judgment of the inspector be agencies for the continued spread of the Mediterranean fruitfly. This request does not include other than sour orange and rough lemon trees.

Description of property _____

EXHIBIT B

MEDITERRANEAN FRUITFLY BOARD,
Orlando, Fla., July 29, 1938.

DEAR SIR: The Mediterranean Fruitfly Board, composed of five members appointed by the Secretary of Agriculture, was created by an act of the United States Congress approved May 23, 1938 (Public, No. 535, 75th Cong.). As stated in that act, the Board "is authorized and directed to conduct a complete investigation and survey of all losses sustained by growers and farmers in the State of Florida resulting from the campaign to eradicate the Mediterranean fruitfly in such State and transmit to the Secretary of Agriculture not later than March 15, 1939, a full report of the results of such investigation and survey: *Provided*, That such report shall serve as information only and shall not be construed as imposing any legal or moral obligation upon the Government of the United States. The Secretary of Agriculture shall, as soon thereafter as practicable, transmit such report of survey to Congress, together with such recommendations as he may, in his judgment, deem advisable."

To prepare its report, the Board needs the information called for in this questionnaire. The questionnaire should be filled in with pen and ink, or preferably with typewriter, and one copy returned promptly to the Mediterranean Fruitfly Board, Orlando, Fla. Since the Board has only a limited time within which to submit its report, it is requested that this inquiry be returned immediately, if possible, and not later than September 1.

Respectfully yours,

MEDITERRANEAN FRUITFLY BOARD,
JAMES W. MORTON, *Chairman*.

READ FOLLOWING INSTRUCTIONS CAREFULLY BEFORE ANSWERING QUESTIONS

1. This questionnaire should be filled in by the 1929 or 1930 owner or his agent, insofar as his losses for the particular year are concerned, unless the property was cash-rented to others; in the case of a cash-rented property, the questionnaire should be filled in by the cash tenant or his agent on the same basis. In all cases it is important that the name of the 1929 or 1930 owner be given. If the farm was owned in only 1 of the 2 years, strike out the year that does not apply.

2. The questionnaire should pertain to all the land operated in 1929 or 1930 as one unit from the same headquarters; that is, all the land operated with the same power, equipment, etc. If two or more such units were owned or operated by one person, a separate questionnaire should be submitted for each unit. If land operated as one grove or farm was located partly in two or more counties, such grove or farm should be reported in the county in which the headquarters, as the center of operations, was located.

3. Only one questionnaire should be submitted for a property. This is important in order to avoid duplication by different persons reporting for the same property.

[On reverse side]

QUESTIONNAIRE ON GROVE AND FARM LOSSES IN FLORIDA CAUSED BY THE
MEDITERRANEAN FRUITFLY ERADICATION CAMPAIGN OF 1929-30

IMPORTANT.—READ REVERSE SIDE CAREFULLY BEFORE ANSWERING QUESTIONNAIRE

I, _____, do
(Name) (Post-office address)

hereby certify that in 1929 or 1930 I was the _____ of a grove or
(Owner, cash tenant, agent of owner, etc.)

farm situated _____ from _____ in
(Miles and direction) (City or town)

_____, Fla., described as the _____ of Section
(County)

_____, Township _____, Range _____;

that such a grove or farm was owned in (1929 or 1930) by _____;

_____; and that the
(Name) (Post-office address)

information contained herein pertains to such grove or farm and is correct to the best of my knowledge and belief.

Date _____ (Signed) _____

Summary of money losses resulting from Mediterranean fruitfly eradication campaign in Florida (1929-30) as reported in mailed questionnaire survey conducted by the Mediterranean Fruitfly Board in summer of 1938

County	Questionnaire reports received	Acres in citrus		Acres in oranges		Acres in grapefruit		Acres in tangerines		Price losses (part questionnaire 3c)	Losses on citrus, sec. 4 and D										Other marketable fruit destroyed (sec. B)	Vegetables destroyed (sec. C)	Livestock losses				Plants other than citrus (sec. D)	Miscellaneous ¹	Questionnaires reporting total losses only	Total, all losses			
		Total	Bearing	Total	Bearing	Total	Bearing	Total	Bearing		Fruit destroyed		Spray damage				Picking and burying drops	Cost of applying spray	Unclassified citrus losses	Total loss, lemons			Total loss on citrus	Horses and mules	Cattle	Poultry					Other		
											Boxes	Value	Spray reduced crop	Damage to trees	Cost of pruning	Total																	
	Number	Number	Number	Number	Number	Number	Number	Number	Number		Number	Value	Spray reduced crop	Damage to trees	Cost of pruning	Total																	
Alachua	29	42.4	40.0	18.7	18.7	5.9	5.0	6.0	6.0	\$450.00	3,050	\$4,840.00		\$1,060.00		\$1,060.00					\$6,350.00	\$244.00								\$400.00	\$18,959.00		
Bradford	3	1.4	1.4	1.4	1.0						50	200.00									200.00	50.00									9,000.00		
Brevard	372	6,252.5	5,325.5	3,121.2	2,618.0	757.1	638.0	143.5	132.0	220,004.58	74,861	102,681.80	\$51,092.19	172,276.24	\$3,300.16	226,668.89	\$64,132.31	\$80.00	\$11,831.50	\$9.50	626,308.58	8,054.05		\$155.00	107.75		\$2,838.00	1,517.03	\$13,080.00	681,022.94			
Citrus	12	201.0	150.0	110.0	140.0	6.9	6.0	0.0	0.0	50.00	6,250	6,250.00				40.00		10.00			7,234.00	235.50					500.00				7,960.50		
Clay	2	7.0	7.0								2,250	2,250.00				40.00					2,290.00										2,290.00		
Dade	5	101.2	91.2	48.0	38.0	48.9	48.0	5.0	5.0		5,865	9,418.75									0,418.75	4,000.00									13,418.75		
De Soto	51	1,498.0	1,418.7	776.3	755.3	203.9	201.0	45.7	45.7	15,172.09	55,532	60,573.00					9,516.22	270.00	2,113.75	17.00	87,662.87	214.00				435.00					88,471.87		
Duval	32	101.7	69.7	73.0	61.0	4.9	4.0	1.5	1.5	11,730.65	22,961	20,059.50				3,384.00					35,324.15	2,407.00		845.00		20.00	416.50				40,551.15		
Flagler	6	46.2	30.7	1.0	1.0						100	315.00				618.55					1,378.55	84.00					6.00				2,051.55		
Franklin	1	0	0	0	0																	1,050.00									1,050.00		
Hardee	123	1,987.0	1,726.9	756.5	653.0	42.5	42.6	58.3	40.8	800.00	68,386	76,711.00	1,071.25	150.00	35.00	1,250.25	4,366.25	155.00		4,825.00	110.00	88,223.50	1,547.50		48.00	115.00	2,542.20				100,936.20		
Hernando	36	506.2	473.7	112.7	127.8	103.0	101.0	81.5	71.0	2,377.23	14,010	17,594.01	573.78	5,355.45	34.50	5,963.73	2,003.13		1,262.40		29,101.40	1,201.15				1,955.00					33,406.05		
Highlands	8	75.5	75.5	13.5	13.5	12.0	12.0	4.5	4.5		11,600	11,867.50				000.00					14,052.50	450.00									15,102.50		
Hillsborough	500	6,653.0	6,017.2	2,652.1	2,482.6	521.6	459.7	138.1	138.1	154,411.15	177,407	214,820.88	2,538.15	326,244.93	4,111.00	332,894.08	16,827.36	191.45	14,637.16	94.00	733,876.08	5,536.50		400.00	181.00	\$1,500.20	8,794.00	11,314.00	150.00	803,826.03			
Indian River	3	34.6	28.2	2.0	2.0	18.0	18.0	0.2	0.2		800	925.00					30.00				955.00	800.00					62.50				1,817.50		
Jackson	1	0	0	0	0	0	0	0	0												0										1,500.00		
Lake	557	0,008.2	7,503.8	4,412.0	4,035.0	1,008.8	1,345.0	1,004.8	668.5	260,450.04	215,607	260,008.52	14,930.85	532,247.88	0,288.57	553,473.30	14,799.18	5,708.50	41,240.37	162.40	1,135,849.21	13,601.27		\$1,750	245.00	02.50	17,756.00	7,950.00		1,244,293.43			
Lee	1	0	0	0	0	0	0	0	0												0										250.00		
Levy	4	3.0	3.0	3.0	3.0						220	220.00									220.00	265.75					240.00				1,710.75		
Manatee	19	76.5	75.3	11.5	11.3			40.0	40.0		1,000	1,625.00					960.00			13.50	2,598.50	1,900.85					1,455.58				20,279.93		
Marion	133	1,074.8	1,813.6	1,521.6	1,434.4	1,588.6	1,401.7	98.2	98.2	47,075.34	27,655	33,348.40	4,050.00	70,847.50	400.00	75,297.50	7,318.00	1,430.00		279.83	4.50	164,743.87	8,652.20		183.00	7,075.00				350,989.82			
Orange	1,025	17,235.0	14,079.1	10,232.1	9,301.0	1,200.4	1,091.5	185.3	185.2	546,215.17	287,036	334,043.08	151,045.98	1,403,554.45	22,904.33	1,577,594.76	15,712.00	74.00		2,000.00	255.50	2,525,805.11	147,085.72	1,255	840.00	2,658.49	73,138.76	300.00	2,790,825.08				
Osceola	210	1,681.0	1,522.7	983.4	884.6	351.3	327.2	224.8	205.5	23,106.80	42,286	74,898.69	13,280.00	180,931.25		194,211.25	7,108.40	387.58		22,483.45	177.00	322,373.17	6,758.75		25.00	226.84	91.00			347,834.00			
Pasco	97	1,455.0	1,177.0	687.0	560.8	191.2	184.4	75.2	70.2	58,179.25	41,314	46,634.09	400.00	27,033.00	1,538.75	28,077.75	3,716.71	1,422.65			138,031.05	11,898.25			100.00		5,654.50	3,023.00		102,708.01			
Pinellas	127	3,069.2	2,214.9	2,073.2	1,000.6	937.0	105.0	102.3	102.3	42,124.21	114,205	135,064.49	1,265.00	83,270.10		84,475.10	6,670.85	470.00		11,461.70	108.00	280,080.35	7,030.10		275.00	72.50		3,125.00	297,082.05				
Polk	1,100	26,071.6	25,872.0	12,118.0	11,617.1	0,670.5	6,582.5	1,400.1	1,342.8	1,003,083.17	457,613	474,780.92	42,867.00	539,765.17	32,112.16	614,744.33	112,576.67	20,905.92	124,243.74	491.75	2,350,880.50	28,028.56		825	1,400.00	414.00	30,042.85	278,080.00	5,434.80	2,730,082.71			
Putnam	187	1,326.6	1,168.5	567.0	508.7	38.8	37.3	56.8	54.3	25,424.40	42,847	44,689.29	20,341.01	165,044.90		192,512.71	3,322.50				267,470.99	17,775.75				7,213.00	2,346.25			331,297.29			
St. Johns	81	180.9	119.0	66.4	66.4	22.6	22.6	1.4	1.4	32,459.75	13,475	15,114.00	115.00	10,234.00		10,349.00					57,919.75	6,891.92				5.40				94,080.57			
Sarasota	0	0	0	0	0	0	0	0	0												153.00									153.00			
Seminole	453	3,446.7	3,063.0	1,861.3	1,710.2	294.7	266.7	402.8	374.1	128,647.98	106,100	123,118.28	28,214.05	269,553.19	3,539.50	301,307.34	2,317.05		375.00	53.00	555,818.65	13,989.40				75.00	6,521.50			772,408.01			
Sumter	66	1,000.1	983.7	837.8	831.6	65.8	65.8	53.5	53.3	200.00	10,901	15,282.50		3,250.00		1,350.00		250.00		20.00	5.00	20,357.50	1,081.00				14,660.00				104,600.00		
Volusia	620	7,172.7	5,709.0	4,429.8	3,773.9	4,433.3	420.6	645.1	574.2	97,465.90	160,121	195,870.60	11,890.00	422,032.77	18,137.46	432,060.23	18,706.61		42.00		764,244.34	19,427.60		125	685.00	37.30	7,557.15	1,307.95	1,600.00	874,356.30			
Miscellaneous ¹	35	393.1	295.7	146.0	116.0	28.2	22.2	19.7	18.7	14,195.67	14,034	16,373.00	940.00	25,358.00		26,658.00	447.94	140.00			57,814.61	348.00				82.50				60,014.01			
Total	6,227	92,530.0	81,825.8	48,611.4	42,341.2	17,835.0	13,027.5	5,559.5	4,908.3	2,684,528.18	1,985,252	2,350,188.10	350,560.86	4,243,457.38	93,348.53	4,687,360.77	295,396.18	31,830.70	238,515.90	1,513.15	10,289,338.98	189,154.10		4,430	5,404.25	4,863.28	\$1,500.20	132,769.33	402,471.85	25,780.42	12,147,471.55		

¹ Includes such items as real-estate losses, dealers' losses, bees and honey, etc.

² Hogs.

³ Rabbits.

⁴ Includes questionnaires on which the county was not reported, and questionnaires received after the county tabulations were summarized.

A. Citrus fruits, 1928-29 and 1929-30 crops

	Oranges		Grapefruit		Tangerines	
	1928-29 crop	1929-30 crop	1928-29 crop	1929-30 crop	1928-29 crop	1929-30 crop
1. Acres in grove.....						
2. Acres in bearing trees.....						
3. Boxes sold, total.....						
<i>a.</i> Sprayed only (included in total).....						
<i>b.</i> Sterilized only (included in total).....						
<i>c.</i> Sprayed and sterilized (included in total).....						
<i>d.</i> Neither sprayed nor sterilized (included in total).....						
<i>e.</i> Estimation of any losses because of spraying or sterilization ("on tree" price basis).....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....
4. Boxes marketable fruit destroyed because of eradication campaign.....						
5. Prices received per box sold ("on tree" price basis).....	\$.....	\$.....	\$.....	\$.....	\$.....	\$.....
<i>a.</i> Sprayed only.....						
<i>b.</i> Sterilized only.....						
<i>c.</i> Sprayed and sterilized.....						
<i>d.</i> Neither sprayed nor sterilized.....						

B. Other marketable fruits destroyed in 1929-30, such as limes, guavas, mangoes, avocados, etc. (Use 1 line for each fruit and explain nature of loss)

	Quantity ¹	Value
1.		\$.....
2.		
3.		
4.		
5.		

¹ Express in commercial units, such as boxes or bushel hampers.*C. Vegetables destroyed, 1929 crop*

	Snap beans	Toma- toes	Green peppers			
1. Acres destroyed.....						
2. Production destroyed (bushels).....						
<i>a.</i> Before harvested.....						
<i>b.</i> After harvested.....						
3. Estimated losses ("in field" price basis).....						

D. Other losses in 1929-30. (Use 1 line for each class of loss and explain nature of loss)

	Quantity	Value
1.		\$.....
2.		
3.		
4.		
5.		

EXHIBIT C

SYNOPSIS OF ACTIVITIES OF THE FLORIDA GROWERS REIMBURSEMENT COMMITTEE
DISCOVERY OF THE MEDITERRANEAN FRUITFLY

In order to bring about an understanding of the work of the Florida Growers Reimbursement Committee, a brief statement is herewith outlined, covering the discovery of the Mediterranean fruitfly and the rules and regulations following this discovery.

The Mediterranean fruitfly was detected on April 6, 1929, at Orlando, Fla., and confirmation of its identity was made by scientists in the National Museum at Washington, D. C.

STATE AND FEDERAL QUARANTINE REGULATIONS

Following the discovery of the fly on April 6, 1929, the State Plant Board of Florida on April 16, 1929, promulgated a quarantine to prevent shipment from the infested areas of all fruit and vegetable products supposed to be hosts to the fruitfly. Following this quarantine by the State Plant Board, and amplifying the same, the United States Department of Agriculture, through its Secretary, made effective on May 1, 1929, a Mediterranean Fruitfly Quarantine. This Federal quarantine apparently recognized the seriousness of the situation, and, in order to protect the agricultural and horticultural interests of the United States at large, set up stringent quarantine regulations.

In order to make such a quarantine effective, certain zones were set up, as follows:

(a) *Infested zone*.—The area included within 1 mile of any property on or in which infestation has been determined: *Provided*, That the State Plant Board of Florida, with the approval of the United States Department of Agriculture, may include in such infested zone such additional area as may be necessary for accomplishing eradication of this insect.

(b) *Protective zone*.—The area included within 9 miles of the outside boundary of any infested zone: *Provided*, That the State Plant Board of Florida, with the approval of the United States Department of Agriculture, may include in such protective zone such additional area as may be necessary to effect the eradication of this insect.

(c) *Restricted articles*.—Fruits, vegetables, and garden and orchard products of all kinds; sand, soil, earth, peat, compost and manure; railway cars, boats, and other vehicles and containers which have been used in conveying fruits or vegetables; and fruit packing equipment and all other articles, including nursery stock which have been associated with the production of or commerce in fruits or vegetables or have been or are contaminated with sand, soil, earth, peat, compost, or manure.

In the infested zone as outlined in subhead (a) above, it will be noted that this zone covered an area within 1 mile of any property on or in which infestations were determined. It can be readily seen that through overlapping of these mile areas a large territory was eventually included in the infested zone, from which neither fruits nor vegetables could be shipped.

Citrus fruits and vegetables growing in an infested zone were confiscated and destroyed in large amounts; this supposedly for the public good, and protection of horticultural and agricultural United States. It can be readily seen that this brought about vast losses to growers of fruits and vegetables, and, as a great many of these crops were produced with borrowed money, the growers were left in stricken circumstances, which, followed by several years of low prices for fruits and vegetables, has now reduced many growers to the point of destitution.

A large number of properties which had been owned by families for generations passed from their hands, due to foreclosure of mortgages, crop and fertilizer liens; and such people, trained only in the arts of agriculture and horticulture, were without means of livelihood, and in many instances have been supported by charity.

MEDITERRANEAN FRUITFLY PERSONNEL AND EXPENDITURES

Following the discovery of the fruitfly in Florida, it was found necessary to build up a large personnel, acting under rules and regulations of the Department of Agriculture at Washington, D. C. This personnel reached the large total of 6,352 persons in the month of July, in 1929, this being the peak month of employment during the campaign. Federal funds to the extent of \$4,738,500 were expended up to and including February 15, 1930.

METHODS OF ERADICATION WORK

The outstanding features, insofar as the growers were concerned, in connection with eradication work were:

(a) The confiscation and destruction of supposedly host fruits and vegetables in infested zones;

(b) The use of arsenical sprays as poison bait for the fruitfly.

While many rules and regulations were promulgated in the eradication campaign incidental to the general campaign, the two outlined above brought about the greatest hardship and greatest losses to the growers.

The use of arsenical spray, which was applied to the citrus trees during the hot months of June, July, and August of 1929, through the use of power sprayers, brought about undoubtedly a great deal of serious damage to citrus tress. In explanation of this matter, the use of plain water, applied to a growing citrus tree during the heat of a summer day, will cause scalding of the tree growth and produce damage; but arsenical spray aggravated this situation to a large degree. In spraying large trees, the spraying machine was driven between the rows of trees, and a repetition of 10 to 15 sprayings eventually burned large holes in the bearing trees and killed the growth thereof, which necessitated a vast amount of pruning in the years following, adding to the financial burden of the grower.

In the spraying of smaller trees, from 2 to 8 years old, this being repeated many times during the summer of 1929, a large amount of the top growth was destroyed, and the trees were definitely hardened up and the true function of the tree retarded for a long period of time to come. Many trees were killed to the ground and had to be replaced.

ORGANIZATION OF FLORIDA GROWERS REIMBURSEMENT COMMITTEE

Following the lifting of the Federal quarantine against Florida fruits and vegetables, varied statements were made as to the amount of the losses sustained by growers of fruits and vegetables as a result of the eradication work and the quarantine.

Certain leading growers in the State, realizing the soundness of these losses, met in Orlando on December 2, 1930, and formed what was known at that time as the Florida Growers Reimbursement Committee. This group of men came from all parts of the citrus and vegetable districts of Florida, and, in the initial set-up, constituted themselves into a fact-finding committee, serving without compensation in the interest of public welfare. This committee set as its objective the accumulation of the number and amount of legitimate claims from citrus and vegetable growers covering losses due to eradication and quarantine regulations during the campaign to eradicate the Mediterranean fruitfly.

At the present time, the personnel of this committee consists of the following men: John F. May, Winter Haven, chairman; W. J. Howey, Howey, vice chairman; W. R. O'Neal, Orlando, treasurer; H. C. Babcock, Orlando, secretary; L. P. Kirkland, Auburndale; J. W. Perkins, DeLand; J. J. Parrish, Titusville; Roy Highfill, Cocoa; H. M. Papworth, Sanford; Judge Burt Fish, DeLand; W. C. Daniels, Eustis; C. D. Walker, Eustis; J. V. D'Albora, Cocoa; John F. Taylor, Largo; W. F. Glynn, Crescent City; J. C. Chase, Sanford; and A. E. Pickard, Orlando.

Following the organization of this committee, a form was originated, made up in triplicate, which allowed the growers to make a statement, under oath, for losses sustained by them.

This form required signature before witnesses and acknowledgment before a notary public.

The following insertion is a blank copy of the form used by the committee:

APPLICATION FOR REIMBURSEMENT

I, -----, of -----
(Name) (City or town)

County, Fla., do hereby certify that, I was the owner of the property listed below, and that the same was destroyed under date of ----- A. D. to ----- A. D. 19-----, by reason of the quarantine imposed in the course of the so-called "Mediterranean fruitfly quarantine."

Legal description of property concerned: Section ----- Township -----
Range -----

96 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

Damage to—	Nature of damage*	Number of boxes	Value
A. Citrus fruits:			
1. Oranges	-----	-----	\$-----
2. Grapefruit	-----	-----	\$-----
3. Tangerines	-----	-----	\$-----
Quantity of damage in boxes, crates, etc.			Value
B. Other fruits:			
1.	-----	-----	\$-----
2.	-----	-----	\$-----
3.	-----	-----	\$-----
4.	-----	-----	\$-----

*NOTE—Under "Nature of damage," insert "Sterilization," "Confiscation", or "Chemicals" according to nature of damage.

Remarks: -----

	Nature of damage	Quantity	Value
C. Vegetable crop:			
1.	-----	-----	\$-----
2.	-----	-----	\$-----
3.	-----	-----	\$-----
4.	-----	-----	\$-----
5.	-----	-----	\$-----

Remarks: -----

D. Damage to real estate:	Nature of damage	Amount of damage	Value
a. Citrus fruit trees:			
Orange trees	-----	-----	\$-----
Grapefruit trees	-----	-----	\$-----
Tangerine trees	-----	-----	\$-----
b. Other damage:			
-----	-----	-----	\$-----
-----	-----	-----	\$-----

TOTAL OF DAMAGE

1. Damage to citrus fruits	-----	\$-----
2. Damage to other fruits	-----	\$-----
3. Damage to vegetables	-----	\$-----
Total damage to personal property	-----	\$-----
1. Damage to citrus fruit trees	-----	\$-----
2. Other damage	-----	\$-----
Total damage to real property	-----	\$-----
Grand total, all damage	-----	\$-----

Signed, sealed, and delivered in the presence of:

-----[seal]

(Follow instructions on back in filling out blank)

STATE OF FLORIDA, County of ----- ss.:

----- being duly sworn, deposes and says:

1. That he is the applicant named in the foregoing application.
2. That he has read the same, and is familiar with the contents thereof, and signed the same, and that the matters and facts set forth therein are true, except the estimate of damage and that this he believes to be true.

Sworn to and subscribed before me this ----- day of ----- A. D. 193--

This application for compensation is furnished the grower without cost by Florida Growers Reimbursement Committee. The grower assumes no obligation by signing and returning same, financial or otherwise, except as to the truth of the statements made herein, nor does the committee make any guaranty of recovery.

INSTRUCTIONS: Read carefully before filling in this blank:

This blank should be filled in with a typewriter, if possible, or if not, with pen and ink. It should be executed in triplicate, one copy being retained by the applicant. Applicant should sign same in the presence of two witnesses, who should affix their signatures as witnesses. Applicant should also sign affidavit, and acknowledge before some proper officer, such as a notary public. Officer taking acknowledgement should sign to the left, and should affix an impression seal and state date of expiration of commission if a notary, or office if a judge. Two copies, both executed, should be returned to Florida Growers Reimbursement Committee.

Paragraph A, reverse side, applies to citrus fruits only. In filling out blank state under "Nature of damage" whether by sterilization, spraying, or confiscation. Give estimated number of boxes so destroyed. The column on the right hand side is for the value of the fruit destroyed.

Paragraph B is for other fruits, guavas, surinam cherries, etc., which may have been destroyed. As in the preceding paragraph, give nature of damage and give number of boxes or crates destroyed, and give their estimated value.

Paragraph C includes vegetable crops, tomatoes, peppers, etc., which were damaged or destroyed. Give nature of damage and, if in crates or packages, the number destroyed. Growing crops destroyed, list by acres, with value.

Paragraph D, subhead (a); give damage to citrus trees. Under "Nature of damage" state injury to trees by application of chemical spray. In this same paragraph, under (b), set down destruction to trees from other causes.

CLAIMS SUBMITTED

Up to December 31, 1931, 6,017 claims had been filed in the office of the secretary of the Florida Growers Reimbursement Committee, totaling in amount \$7,423,736.27, and since that time something like 700 or 800 claims have been filed which have not been tabulated nor added to the above.

Following is tabulation by counties and by type of damage:

County	Number	Citrus fruits	Other fruit	Vegetables	Citrus trees	Other damage
Alachua.....	6	\$65.00	\$421.00	\$1,055.00	\$600.00	\$125.00
Bradford.....	1	50.00	50.00	500.00		
Brevard.....	371	281,090.35	8,142.85	16,943.55	129,133.15	77,451.56
Citrus.....	1					24.00
Dade.....	1				625.00	
De Soto.....	11	5,762.25		1,225.00	1,100.40	640.21
Duval.....	12	17,162.50	570.00	1,520.60	654.00	5,775.00
Escambia.....	11				1,150.00	
Gadsden.....	1			10.50		
Hardee.....	23	16,469.94	447.00	230.00		1,881.00
Hernando.....	44	5,787.27	970.60	7,739.55	8,049.35	5,340.63
Highlands.....	7	4,270.41	120.00	225.00	80.00	259.60
Hillsboro.....	524	177,665.99	10,907.88	75,346.30	333,097.28	27,059.94
Indian River.....	1	275.00	50.00	25.00		50.00
Jackson.....	1					1,500.00
Lake.....	525	258,830.12	19,068.75	111,835.22	199,774.70	45,445.92
Lee.....	1				1,994.67	644.75
Levy.....	3	6.00	256.55	940.00	75.00	
Manatee.....	11	13.50	1,473.15	1,970.00		353.08
Marion.....	193	7,583.79	4,996.68	269,009.25	45,136.50	17,827.00
Martin.....	1	250.00				
Nassau.....	1	45.00			60.00	
Orange.....	1,318	846,660.30	31,894.00	177,590.20	1,023,291.30	134,210.85
Osceola.....	324	55,447.38	8,835.05	19,084.59	69,464.20	15,750.08
Pasco.....	68	31,231.80	1,162.75	2,574.25	19,335.62	6,259.10
Pinellas.....	88	78,379.05	4,362.10	3,862.00	58,443.75	7,959.71
Polk.....	907	625,424.27	15,433.09	52,132.82	432,000.33	157,033.04
Putnam.....	213	38,524.34	7,310.40	15,187.20	74,484.55	12,788.87
Seminole.....	377	59,442.65	7,296.80	129,083.54	152,301.43	8,571.49
St. Johns.....	7	1,485.00	451.00	4,021.25	5,649.00	159.00
St. Lucie.....	8	120.00	513.00	3,522.44	2,779.37	406.35
Sumter.....	86	5,520.25	2,157.75	45,060.57	725.00	500.00
Volusia.....	870	252,726.82	19,099.45	66,391.32	321,951.20	30,174.14
Miscellaneous.....	10	1,772.05	500.00	720.00	4,979.50	84.91
Total.....		2,832,651.03	146,589.85	1,007,814.15	2,878,405.00	558,275.24

EXPENSES MET BY CONTRIBUTIONS

All expenses incidental to the work of the Florida Growers Reimbursement Committee have been met by voluntary contributions.

It has been the purpose of this committee not to place any financial burden, however small, on the individual grower in this work. The grower assumed no obligation, financial or otherwise, in filing statement of losses, except that incurred in making affidavit to the truth of his statement therein.

The Florida Growers Reimbursement Committee has made no guaranty or promise in connection with the ultimate hope of gaining reimbursement to the grower. The committee had no paid employees, nor has any member of the committee received any financial remuneration for services rendered.

FLORIDA GROWERS REIMBURSEMENT COMMITTEE,
JOHN F. MAY, *Chairman*.

MARCH 16, 1934.
I. L. O.

(Exact compared copy of official mimeographed report, by Florida Growers Reimbursement Committee, a copy of which mimeographed report was furnished by the committee.)

EXHIBIT D

This exhibit is the printed report of a hearing conducted at Orlando, Fla., by special committee of the House Committee on Appropriations acting under House Resolution 139, adopted February 10, 1930, at the second session of the Seventy-first Congress. This document previously printed by the Government is not here reproduced.

EXHIBIT E

This exhibit is part of the report of the State Plant Board of Florida, prepared by the plant commissioner, Wilmon Newell, and submitted to the chairman of the State Plant Board of Florida under date of January 12, 1931. The entire report of the State plant board was submitted to His Excellency Doyle E. Carlton, Governor of Florida, by the chairman of the board, P. K. Yonge, under date of February 1, 1931, with the request that the report be submitted to the Legislature of Florida. The entire report was published February 1931 as the Eighth Biennial Report of the State Plant Board of Florida being its official report for the period July 1, 1928, to June 30, 1930.

MEDITERRANEAN FRUITFLY REPORT

INTRODUCTION

The plant commissioner presents his report on the Mediterranean fruitfly-eradication campaign for the period from April 6, 1929, to December 31, 1930. No attempt has been made to prepare two annual reports covering the periods from April 6 to June 30, 1929, and from July 1, 1929, to June 30, 1930, as has been customary heretofore. It is believed the value of this report will be greatly increased by consolidating the activities of the two periods into one volume, thus providing a full and complete report on the activities of the fruitfly campaign from its inception to December 31, 1930.

EARLY DEVELOPMENTS

On Saturday, April 6, 1929, larvae recognized as those of some species of fruitfly were found in grapefruit being prepared for the evening meal by J. C. Goodwin, nursery inspector of the State plant board, at his home in Gainesville. The infested fruit had been given to Mr. Goodwin several days previously by employees of the Bureau of Entomology, United States Department of Agriculture, located at Orlando, Fla. On the morning of Monday, April 8, these larvae were identified by E. W. Berger, entomologist, G. B. Merrill, associate entomologist, and J. C. Goodwin, nursery inspector, all of the State plant board, and D. B. Mackie, senior entomologist of the California Department of Agri-

culture, who was in the State at that time, as being larvae of some fruitfly. As the board did not possess a complete collection of fruitfly larvae for purposes of comparison, it was impossible for these specialists to make a definite identification. Specimens of the larvae were taken to Washington, D. C., on April 8, by J. H. Montgomery, assistant plant commissioner, and were there identified tentatively by C. T. Greene, fruitfly specialist of the Bureau of Entomology, as being larvae of *Anastrepha*, probably *fraterculus*. Adult specimens, collected by representatives of the Bureau of Entomology, United States Department of Agriculture, were sent by air mail from Orlando directly to Washington and were identified on April 10, as being Mediterranean fruitfly by C. T. Greene and J. M. Aldrich, the latter dipterologist and associate curator of the National Museum at Washington, D. C. On April 11, adults collected at the same time and in the same property as those sent to Washington were determined by G. B. Merrill, associate entomologist of the State plant board, as Mediterranean fruitfly.

On April 8 inspectors of the board were sent to Orlando to investigate the source of the fruit secured by Mr. Goodwin. These men arrived at the Bureau of Entomology laboratory about 6 o'clock that evening, and discovered infested fruit under several grapefruit trees growing on the laboratory grounds. Whether the fruit found infested with Mediterranean fruitfly in Gainesville, Fla., came from these trees or not is not definitely known.

All available plant-board inspectors were ordered to report to Orlando, and a hurried survey of all citrus plantings in Orange County was started. This survey showed many groves to be infested, and by April 30 infestations had been found in 364 properties in 51 separate localities in 11 different counties.

On April 9 the plant commissioner, appreciating the seriousness of the situation and having reached the decision that immediate steps should be taken with a view to eradicating this pest from Florida, wired J. H. Montgomery, who was at that time in Washington, to secure all possible information from the Washington authorities which might be of use in handling the situation. Acting upon these instructions, Dr. Montgomery was in constant contact with responsible officials of the Department of Agriculture discussing the situation as it developed. On April 9, a conference was held in the office of the Secretary of Agriculture. The conference was participated in by a number of the officials of the Department, including, among others, A. F. Woods, Director of Research, W. C. Campbell, Director of Regulatory Work, C. L. Marlatt, Chief of the Plant Quarantine and Control Administration and head of the Bureau of Entomology, A. C. Baker, in charge of the Division of Tropical and Sub-tropical Insect Investigations for the Bureau of Entomology, W. A. Taylor and Karl F. Kellerman, Chief and Associate Chief, respectively, of the Bureau of Plant Industry, J. E. Graf, Assistant Chief of the Bureau of Entomology, and W. A. Jump, Budget Officer of the Department of Agriculture. At this conference the gravity of the situation and the importance of prompt and vigorous action were recognized. A decision was reached that Drs. Marlatt and Baker should proceed to Florida, survey the situation and formulate preliminary plans in conjunction with the State plant board for the eradication campaign. The financing of such an activity was discussed at length and arrangements were made for the immediate diversion of funds from other appropriations of the Department for use in Florida.

On April 11, C. L. Marlatt (Chief of the Plant Quarantine and Control Administration), A. C. Baker (entomologist in charge of Tropical and Sub-tropical Insect Investigations, Bureau of Entomology), and J. H. Montgomery (assistant plant commissioner and quarantine inspector of the State plant board), arrived in Orlando. The officials of the Plant Quarantine and Control Administration concurred in the preliminary plans as formulated by the plant commissioner as executive officer of the State plant board for the eradication of the fly. Dr. Marlatt as Chief of the Plant Quarantine and Control Administration and representing the Secretary of Agriculture requested that the plant commissioner head the cooperative activity in Florida. That evening a meeting attended by Drs. Marlatt and Baker and the plant commissioner and by prominent growers, shippers, representatives of the press and other interests, was held at the Government laboratory at Orlando and the situation fully discussed.

On April 14 eight of the most experienced inspectors of the Plant Quarantine and Control Administration who had been engaged in the Morelos fruitfly eradication campaign in the Lower Rio Grande Valley in Texas, headed by P. A. Hoidale, in charge of that project, arrived at Orlando to assist in the campaign in Florida. Included in this party was Foster H. Benjamin, a specialist in the identification of fruit flies. From the date of Mr. Benjamin's arrival in Orlando to the present time he has made all identifications of the Mediterranean fruitfly.

On April 15, the plant board held a public hearing in Gainesville, which hearing was attended by Dr. Marlatt and representatives of growers, shippers, transportation and allied business interests. At this meeting the board confirmed the program for eradication as formulated and presented by Drs. Marlatt and Newell and authorized the plant commissioner to accept the offer of the Administration to act as its agent in charge of the field work in Florida. At the same time rules and regulations necessary for such an eradication program were adopted by the board.

On the same date, April 15, through joint action of the board and Governor Doyle E. Carlton, the emergency fund of \$50,000 provided by the previous session of the Florida Legislature, was released for immediate use. Other funds were diverted from the regular appropriations of the board and made available for use in the emergency.

On April 15, the date of the public hearing held by the plant board at Gainesville, notice of a similar hearing to be held by the Plant Quarantine and Control Administration at Washington, D. C., on April 28 was published. The purpose of this hearing was to consider placing quarantines against Florida products in order to prevent the spread of the Mediterranean fruitfly through interstate movement of host fruits and vegetables. The plant board was represented at this hearing by J. H. Montgomery and H. H. Hume.

On April 16, a conference between the plant commissioner and growers, civic and county officials, representatives of the banking, real estate, legal, and hotel interests was held in Orlando to discuss the desirability of calling out the National Guard to act as quarantine guards on the limits of the infested area. It was felt that guards should be placed immediately to prevent the movement of infested material into the noninfested areas of the State, and that time was too short to hire and train civilian guards. A resolution was drawn up by those present petitioning the Governor to call out the National Guard immediately. On the same date, His Excellency, Gov. Doyle E. Carlton, authorized the use of members of the Florida National Guard, acting as agents of the plant board, for enforcement of the State quarantine to prevent the distribution of infested material from the affected areas. The first contingent of the National Guard commenced road patrol work on April 18. Between the finding of the first infestation and the time the National Guard took over the patrol work, city police of Orlando and county traffic officers of Orange County rendered efficient service in intercepting and preventing movement of citrus fruits by trucks from the infested area to points outside thereof.

On April 16, the Washington office of the Plant Quarantine and Control Administration sent H. T. Cronin to Orlando as fiscal agent for that organization. Inasmuch as both Federal and State funds were expended in this cooperative activity, Mr. Cronin was on April 27 appointed to act in a similar capacity for the plant board and, after furnishing a \$15,000 fidelity bond, \$10,000 of State funds were turned over to him as a "revolving fund" to care for necessary immediate expenditures which could not readily be handled through customary channels.

On April 17, the United States Department of Agriculture made available \$40,000 for the campaign against the fly, which sum was transferred from the pink-bollworm appropriation of the Plant Quarantine and Control Administration. Of this amount \$32,194.88 was expended and the balance eventually transferred back to the pink-bollworm account.

On April 23, 10 agents of the Plant Quarantine and Control Administration arrived in Orlando to assist in the inspectional work. These men had been employed on the pink-bollworm project in Texas.

On May 1, 1929, quarantine 68 of the Plant Quarantine and Control Administration became effective. This quarantine had two main objectives: (a) The prevention of the spread of the Mediterranean fruitfly from the infested areas, and (b) the eradication of the pest. These two objectives were so closely related that whatever contributed to the success of one likewise had an effect on the other. The quarantine therefore prescribed the conditions under which Florida products susceptible to fruitfly attack could be shipped into other States and also laid down in a more or less definite form the program to be followed in the eradication campaign which had been determined upon. As any quarantine effort within the State as well as the actual eradication activity could only be carried forward under the police power of the State, quarantine 68 laid down as conditions under which interstate commerce in host fruits and vegetables could be continued the requirement that an intrastate quarantine must be maintained and also that a serious effort be made to eradicate the fly. In this latter direction quarantine 68 went

into rather lengthy detail as to the measures to be used and the manner of their application. In this connection we quote herewith a portion of regulation 2 of quarantine 68, effective May 1, 1929:

"The interstate movement of restricted articles from any part of the State of Florida will be conditioned on the said State providing for and enforcing the following eradication and control measures in manner and by method satisfactory to the United States Department of Agriculture, namely:" Then followed the conditions which as already indicated covered the eradication program to be followed and the maintenance of an effective intrastate quarantine.

On May 2 the sum of \$4,250,000 was made available by congressional action for fruitfly inspection and eradication purposes.

On June 7 the legislature appropriated the sum of \$500,000 for fruitfly eradication in Florida.

FLORIDA LEGISLATIVE COMMITTEE

In order that close contact could be maintained between the members of the legislature and the officials in charge of eradication activities, not only for the purpose of securing any legislation needed in connection with the Mediterranean fruitfly work, but to serve as a standing committee to cooperate with, support and assist the State plant board in its fight on the fly, a legislative committee was created in the last session of the legislature. This committee consisted of: Senator A. W. Young, Vero Beach, chairman; Senator J. J. Parrish, Titusville; Senator John J. Swearingen, Bartow; Representative S. W. Getzen, speaker, house of representatives, Bushnell; Representative I. N. Kennedy, Eustis; Representative George I. Fullerton, New Smyrna; Representative A. O. Kanner, Stuart.

Reports were made to the members of the committee at various times during the course of the campaign, and the committee kept in close touch with the situation. The advice and counsel of the committee were sought and freely given, and were of great value to the authorities.

ERADICATION CAMPAIGN

PLAN OF CAMPAIGN

At the request of the Plant Quarantine and Control Administration and with the approval of the State plant board the plant commissioner was placed in charge of the undertaking both for the United States Department of Agriculture and for the State of Florida. A plan of campaign looking to the extermination of the Mediterranean fruitfly in Florida was laid down. Certain modifications of this plan were made from time to time as conditions indicated or necessitated, but in the main it was adhered to throughout. This program, which was carefully worked out in detail, embraced the following features:

1. The division of the State into (a) infested zones, which included the area within 1 mile of any property on or in which infestation had been determined and (b) protective zones, which included the area within 9 miles of the outside boundary of any infested zones.

2. Intensive inspections throughout the State.

3. The destruction of all host fruits and vegetables in infested properties as rapidly as found, together with the destruction of such material in the surrounding mile (infested) zones.

4. Application of a poison bait spray throughout both infested and protective zones.

5. For the purpose of maintaining a summer host-free period the destruction of all summer-ripening host fruits and the prohibition of summer-ripening vegetables in both infested and protective zones.

6. In the infested zones, the removal of all citrus and other host fruits or host vegetables (throughout the year) prior to their reaching a stage of maturity susceptible to the fly, and as to host vegetables, the prohibition of planting such vegetables "until the State plant board, with the approval of the United States Department of Agriculture, shall determine that all infestation in such zone has been eliminated and that the restrictions of this paragraph shall no longer remain in force with respect thereto."

7. Requirement of orchard and packing-house controls, control of transportation in interstate and intrastate commerce, control of motor vehicle and other road movement and other features of sanitation and protection enforced under State authority within the infested and protective zones.

INSPECTION

It was necessary to determine where the Mediterranean fruitfly was in Florida, how heavy the infestation was, what fruits were hosts, and such field information covering its life history as might be necessary for the handling of the project. Inspection was of three kinds: Scouting by special, high-grade men to secure an early comprehension of the situation; standard, a more detailed inspection but still quite rapid; and intense, during which an area in which the scouts had located the insect was examined in minute detail. It became apparent at an early date that the insect had confined its work to cultivated economic or ornamental fruits. The fruits of vegetable plants were never found infested in the field nor had the insect attacked the wild fruits except in a single instance. Many fruits and vegetables were attacked when confined with the insect in cages, but the fly population had apparently not become dense enough for it to infest these same fruits and vegetables under open field conditions. Up to December 31, 1930, 1,002 infested properties were found varying all the way from a single fruit or tree on a property to those in which infestation was almost 100 percent. Each property was posted with placards indicating that the Mediterranean fruitfly had been found on it.

IDENTIFICATIONS

The identification section examined and identified all suspicious material sent to the laboratory established at Orlando for that purpose. All identifications were made by specialists of the plant quarantine and control administration stationed at Orlando. This work was not done by inspectors in the field but all suspicious larvae, adults, and pupae were placed in alcohol, in vials, and sent to the laboratory at Orlando.

PREVENTION OF SPREAD

It was decided early in the campaign that the large means of spread was through the transportation of infested fruit, although the possibility of spread by flight and by moving vehicles (automobiles, railway cars, auto trucks, etc.) was not overlooked. Consequently the movement of all host fruit and vegetables within the infested area was brought under control; in addition to this all host fruit and vegetables found on infested properties, and on all properties in the mile zone were destroyed.

As a necessary important adjunct to eradication, quarantines were established around all infested properties or areas to prevent movement of infested fruit into uninfested areas. The quarantine guard posts, established on all highways leading out of infested areas, were manned night and day. All automobiles or other vehicles were stopped at these posts and examined for host fruits and vegetables. When such were found they were taken up and forwarded to the identification laboratory at Orlando for examination. Movement of host material by trains and boats was brought under control and inspected. Baggage carried by passengers was also inspected.

During the first few months of the campaign the interiors of automobiles were sprayed on leaving the infested area to destroy or drive out any flies that might have gained lodgment. Railway cars, both freight and passenger, were required to be closed or screened when passing through infested areas. Trucks carrying fruit for retail-store trade and for distribution were screened. The doors and windows of all stores offering host fruits or vegetables for sale were also screened. Every possible precaution was taken to prevent the spread of the fly.

Due credit should be given at this point to the officers and men of the Florida National Guard assigned to the road patrol section under the direction of Vivian Collins, adjutant general of the State of Florida. Members of this organization were engaged in road patrol activities from April 18, 1929, to July 31, 1930.

To prevent spread to other States, host fruits and vegetables were moved out of Florida only after inspection in both field and packing house, and then only under permit. It was found that fruit could be sterilized by heat or by cold and this method was used as a further safeguard against infested fruit entering southern and western markets.

DESTRUCTION OF INFESTED AND EXPOSED FRUITS AND VEGETABLES

Between May 1, 1929, the date quarantine 68 was promulgated, and September 1, 1929, when the revised quarantine became effective, when an infestation was found all host fruits and vegetables in the infested zone of 1 mile radius surrounding the property were destroyed as required by Federal quarantine 68. This was

done by collecting and burying such material. The bottoms of the burying pits were first dressed with refuse or crude oil, lime was placed over the last fruit put in, and finally a covering of soil 3 feet deep was placed over it. Fruit was also destroyed by grinding and cooking with steam.

A radical change was made in the area involved by the finding of an infestation when quarantine 68 was revised, effective September 1, 1929. Destruction of host fruits and vegetables was required on the infested property only, and not on all properties located within the mile zone. Even on the affected property a graduated scale of clean-up, depending upon the intensity of infestation, was provided for. If the infestation was found generally distributed throughout the property, all host fruits and vegetables remaining on the property were destroyed. If a careful inspection showed the infestation to be confined to a limited portion of the grove, all host material in that portion was destroyed and provision was made for the processing of host fruits and vegetables available from the uninfested portion of the property. Similarly, if the infestation was so limited that in the judgment of the inspector all risks could be eliminated by the sterilization provided for elsewhere in the regulations, sterilization and shipment to authorized destinations outside the State were authorized. This authorization was, however, conditioned on the prompt clean-up and destruction of all host fruits and vegetables in the infested portion of the property concerned and compliance with any other safeguard as to the handling and distribution as required by the inspector.

Up to December 31, 1929, the official forces gathered and destroyed 489,108 boxes (of approximately one and three-fifths bushels each) of citrus fruits, 49,974 bushels of host vegetables and 27,395 bushels of minor and wild noncitrus fruits. In addition to infested or potentially dangerous fruit and vegetable material disposed of by the official force, a large amount was disposed of by volunteer citizens' organizations, though those activities were not directed by or in any way under the control of the Department or the State plant board. General clean-up activities were abandoned at this time, January 1930, on account of lack of the necessary funds. The finding of the infestation in Orlando in March 1930, required no destruction of commercial citrus fruit, as the infestation was found in sour orange after the crop had been moved to the markets.

HOST-FREE PERIODS

For the summer months of 1929, in addition to the destruction of all host fruits and vegetables in the infested zones, quarantine 68 required that a host-free period be maintained in the protective zones beginning on May 1 and continuing for 5 months. Prior to the commencement of the host-free period regulation 2B of quarantine 68 required the shipment, destruction, or processing of all ripe or ripening citrus fruits growing within the protective zones and prohibited the planting or growing within the protective zones of vegetables which would mature or reach a stage of susceptibility during the host-free period. The only host fruits or vegetables permitted to grow or exist in the protective zones at any time were citrus fruit on the trees in such stage of immaturity as not to be susceptible to infestation and host fruits and vegetables in storage or on retail sale for immediate consumption. Robbed of fruits in which to lay their eggs and multiply, any carry-over of the insect would have to be by means of adults originating before the host-free period was inaugurated.

SPRAYING

To make certain that there would be no carry-over of adults, poisoned bait spray made from arsenic, molasses, crude brown sugar, and water, was used throughout the infested area. This was sprayed at regular intervals in small quantities on foliage and plants, wild and cultivated, in both towns and open country. In the fall of 1929 copper carbonate was used instead of lead arsenate.

TRAP SURVEY

As a further check on the presence of the insect, traps baited with kerosene were used. At one time as many as 12,645 traps were scattered throughout the affected districts. These made it possible to ascertain the effectiveness of control measures and in a few instances the first indication of the insects being in a new area came through catching adults in traps.

OFFICIAL COMMITTEE REPORTS

That the plan of campaign outlined in the immediately preceding paragraphs was fundamentally sound is evidenced by the conditions and recommendations incorporated in the reports of two committees composed of eminent entomologists and horticultural experts which completely surveyed the situation.

The first committee, named by President Hoover, visited Florida in July 1929. This committee was composed of: Vernon Kellogg, permanent Secretary of the National Research Council; H. A. Morgan, president of the University of Tennessee; T. P. Cooper, dean of the Kentucky State College of Agriculture and director of the Kentucky Extension Service; Victor R. Gardner, director of the Michigan State Experiment Station and professor of horticulture in Michigan State College; T. P. Headlee, professor of entomology in Rutgers College and State entomologist of New Jersey, and entomologist of the New Jersey State Experiment Station; G. A. Dean, head of the department of entomology in the Kansas Agricultural College and entomologist of the Kansas State Experiment Station; and H. J. Quayle, professor of entomology in the University of California and entomologist of the citrus experiment station at Riverside, Calif.

On October 12, 1929, the Secretary of Agriculture, acting in conjunction with Will R. Wood, chairman of the House Committee on appropriations, appointed another committee selected by the president of the University of Indiana. This group consisted of: W. O. Thompson, president emeritus, Ohio State University; W. C. Reed, commercial fruit grower of Vincennes, Ind.; W. P. Flint, chief entomologist, Illinois Natural History Survey; W. H. Alderman, head of the department of horticulture, University of Minnesota; and J. J. Davis, head of the department of entomology, Purdue University. Both committees made exhaustive investigations into the plan of the campaign, the manner in which it was being conducted, the necessity for it, the prospects for success and ways and means of continuing the activity. The reports were so informative that they are here incorporated as a portion of this report.

REPORT OF COMMITTEE OF SEVEN

"WASHINGTON, D. C., July 19, 1929.

"Hon. ARTHUR M. HYDE,

"Secretary of Agriculture, Washington, D. C.

"SIR: The committee of seven, appointed by you to make careful studies of the present status and possibilities for eradication of the Mediterranean fruitfly, also to study the desirability of the maintenance or expansion of the present program, or alternative possibility of commercial control, reports as follows:

"Economic Background

"The economic situation of Florida, the immediate future of the State is definitely and intimately related to the policy which may be adopted in relation to the Mediterranean fruitfly. The region involved in the infestation is 34 percent of the land area of Florida. It contains 72 percent of the bearing citrus trees, and based upon a 3-year average, 80 percent of the carload shipments of citrus fruit originate in this area. The annual income from the citrus crop and from other host crops which may be affected by the fly is upward of \$60,000,000. A capital investment for the same crops exceeding \$300,000,000 is threatened. Industries dependent upon citrus fruit represent an annual income of approximately \$52,000,000. Agriculture, of which the citrus and kindred industries represent the larger part, is the economic foundation of the State. From one-quarter to one-third of the income accruing to the State, other than that pertaining to the tourist trade, may be attributed to agriculture. The permanence of the home and the adequate support of the families of 40 percent of the rural farm population of Florida are threatened by the fly. The income for the State for the purpose of government is largely affected by the conditions of the citrus industry and its kindred commercial, transportation, and industrial development.

"In the event the fruitfly should escape from Florida, infesting the regions of the South and West, capital values invested in properties producing susceptible fruits aggregating \$1,800,000,000 and producing annual incomes of \$240,000,000 are threatened. Infestation by the fly would bring chaos to many agricultural regions of the South and West. Their interest in the policy which may be adopted with relation to the fruitfly is even greater than that of Florida.

"The consumers of the United States, likewise, are affected. An infestation of the Mediterranean fruitfly may affect the reduction of susceptible products by 25 or even 50 percent. It is estimated that a reduction in the production of susceptible fruit by 20 percent will increase the cost of fruit to the consumer by approximately 24 percent. In addition the consumer is also directly interested by the fact that the industry or trade with which he may be connected will be affected by the spread of the fruitfly.

"The cost of commercial-control measures and of quarantines, should the fly escape to other regions, would involve an amount difficult to estimate, but undoubtedly greater than the sum required for eradication. This cost would fall upon the National Treasury, the States involved, and upon numerous individuals.

"This brief statement of the economic background evidences the national interests that are involved. The fact that the citrus industry of Florida furnishes approximately 40,000 cars of citrus fruit to the railroads is an indication of the widespread economic effect that general infestation would involve.

"Eradication or Control

"Basing its judgment on careful observation, the results of research, and the progress toward eradication that has been made in the past 3 months, the committee considers eradication practicable under present known conditions. This will require vigorous effort, large additions to present forces, fearless action, maintenance of the full cooperation of Florida citizens, and ample funds promptly available.

"Plan of Eradication

"You commissioned the committee to study the desirability of the maintenance or expansion of the present program and plan of eradication. Particular attention has been given to this program and plan of eradication as now operating. The committee recommends that the work of eradication be expanded. Such expansion, vigorous and immediate, is imperative to the success of the work.

"The committee believes advisable a system of certification permitting the entry of susceptible fruits and vegetables into interstate commerce. Experimental evidence indicates that a system of processing whole fruit may be devised which is economically feasible and will insure freedom from the fly. Under such procedure: (1) Reimbursement to growers from the National Treasury is not required; (2) a sound economic background for the industry is restored, and (3) the full cooperation of growers and citizens of Florida is maintained.

"An arrangement which assures that the products entering into interstate commerce are free from all stages of the fly, and which permits the growers to continue their business and industry is essential.

"Attached hereto (see below) is a general statement of a program that the committee considers necessary to carry out the work of eradication. It recognizes, however, that as time goes on modification may be necessary, and it has confidence that such modification should be determined by the law enforcement and research organization in charge of the work.

"Progress Made in Eradication

"In spite of the fact that the area considered as infested has shown accessions, the progress toward eradication has been rapid. Centers of infestation have been so thoroughly cleaned, and sources of infestation removed, that in the infested zone it is difficult to find any of the stages of the Mediterranean fruitfly. At the beginning of the campaign flies were numerous, easily found, and existed in great numbers at points of infestation. Measurement of progress is difficult. But the committee has been impressed with the rapidity of the clean-up work, the effectiveness of the poison-spray campaign, the progress of inspection and its increasing thoroughness. Upon every side there is found evidence of increasing efficiency and conviction upon the part of those in charge that they are making progress. A description of the physical equipment and of the methods used in carrying on the eradication program would be interesting but appears unnecessary in this report.

"Representatives of organizations, citizens, joint committee of the Florida Legislature, and the plant quarantine board, as well as members of the staff of the Federal and State organization cooperating in this work were examined by the committee. We were impressed by the solidarity of purpose.

"No intimation was apparent of lack of confidence in a program of extermination. Desire was expressed to bring about eradication, and willingness to continue the work until brought to successful conclusion, was evidenced by every individual or organization represented."

PROGRAM RECOMMENDED BY COMMITTEE AS NECESSARY FOR CARRYING OUT WORK OF ERADICATION

"(1) *Inspection to determine spread.*—Prompt provision should be made for inspection, adequate to determine the spread of the fly, not only in Florida but possibly in other States. This will mean considerable enlargement of present inspection forces.

"(2) *Host fruits and vegetable certification.*—Adequate provision should be made for the certification of all movement of host fruits or vegetables produced in any State or portion thereof invaded by the fruitfly.

"(3) *Removal of minor host plants.*—As absolutely essential to the eradication object, provision should be made under State regulation for the grubbing up or cutting down and removal—in other words complete elimination—of host plants of minor commercial importance, the object being to maintain, for the protection of the principal crop in each area, a nonhost or starvation period during the interim of the maturing of such crop. It is understood that this is to replace any effort to eliminate the fruit from such alternate hosts from week to week as it ripens as impracticable, both from the standpoint of accomplishment and of cost.

"(4) *Destruction of flies and puparia.*—Citrus growers in infested areas should be required under State and Federal regulations to spray their groves at such periods as shall be required as necessary to destroy adult flies, and similarly, if practicable, soil treatment to destroy puparia.

"(5) *Shortening of cropping season.*—To reduce as much as possible the opportunity of the insect to breed up in the major host crop of any area, the shipping season should be terminated as early as practicable. The shipping season in Florida for citrus normally extends from September to June or longer. By more adequate provision for holding of fruit in cold storage and by enlarging methods of processing fruit it should be possible to terminate by the 1st of March, the harvesting of the citrus crop, and similarly to shorten the period in the spring and early summer of other crops.

"(6) *Orchard and crop clean-up.*—As supplementing (5), provision should be made under State regulation for the prompt clean-up of orchards or other crops coincident with the close of the stated harvesting period. As corollary thereto all culls and discards should be promptly destroyed and drops should be removed at weekly intervals throughout the ripening and harvesting period.

"(7) *Safeguarding fruit, etc., for shipment.*—Under the indication of recent experimental work citrus fruit and possibly also other host fruits and vegetables may be treated or processed so as to make possible movement in commerce without risk of carrying infestation. This shall apply to the movement of all citrus fruit leaving infested States or districts after successful demonstration of its commercial practicability. Safeguarding movement of other host fruits and host vegetables should similarly be required upon determination of equivalent methods.

"(8) *Research work as basis for control.*—This field of work should be enlarged to meet all the needs of the eradication effort in Florida or elsewhere, and also to include studies of the fruitfly situation in other countries where this pest has become established.

"(9) *Port inspection.*—To minimize risk of future introduction of the Mediterranean fruitfly or other serious pest, provision should be made for more adequate expansion of port-inspection service.

"NOTE.—This program provides (1) for the enlargement of work now under way; (2) for the elimination of the special restrictions on so-called infested zones, including the removal of fruit; and (3), as partial substitution for (2) the safeguarding by processing of fruit and other hosts, as indicated in paragraph (7) above. The success of this enlarged program is absolutely conditioned on the carrying out of these requirements under State regulations and with the full and complete cooperation of State officers and all associations and persons in interest.

"With respect to the elimination of fruit removal hitherto provided for in both State and Federal regulations, it has become apparent that the removal of fruit now developing in such zones is impracticable if not impossible of accomplishment even under the expenditure of any possible or reasonable funds, and that therefore the continuation of the eradication program must be based on the development and intensifying of other methods of control."

REPORT OF THE COMMITTEE OF FIVE

"WASHINGTON, D. C., October 22, 1929.

"Hon. ARUTHUR M. HYDE,

"Secretary of Agriculture, Washington, D. C.

"SIR: Your committee, appointed to make a study of the Mediterranean fruit-fly in Florida, with special reference to progress of the work the past 3 months, the possibilities of eradication and the future needs so far as determined at the present time, reports as follows:

"In order to be familiar with the problem, the committee spent the past week in Florida, during which time, 1,300 miles through the infested and outlying areas were covered and many citizens of Florida interviewed.

"We concur with the report of your committee of seven regarding the economic importance of the insect and the need for eradication. The Mediterranean fruit-fly should be recognized as a potential pest of very great importance to the fruit industry of the Southern States; also the results to date clearly forecast the possibility of complete eradication in Florida and this goal should be vigorously sought.

"We commend the work of the research and control forces, the former for the progress made in the short period since the discovery of the infestation April 6, 1929, with attractants, poison sprays, host-plant studies and fruit sterilization; the latter for the apparent thoroughness and completeness of the quarantine and eradication work. We likewise commend the cooperation of the growers and the sacrifices which they have made in destroying hundreds of thousands of boxes of fruit, in order to aid in the eradication. A study of the activities of the research and control forces, and the expenditures to date shows an economical and efficient use of the funds available.

"Progress of Eradication and Needs for the Future

"The research division has made fundamental studies which have had an important bearing on the conduct of the eradication program of the past 6 months and which will have an increasing value for any future program of control or eradication. A study of wild fruits, including the period of maturing and susceptibility to fly attack, has revealed facts which will enable a continuation of the eradication program and elimination—for the present, at least—of work which would cost many millions of dollars. The studies of cold- and heat-sterilizing processes which will permit uninterrupted shipment of citrus fruits have been basic and seem to assure the development of methods which will not only eliminate the danger of spread but may improve the color and reduce rots over previous commercial methods. The finding and utilization of a poison spray to destroy the flies was doubtless one of the chief factors in bringing about the present apparent absence of infestation. Evidences of temporary injury by this spray to the citrus tree and its fruit were apparent, especially in groves where the grower has been unable to finance proper upkeep, but further studies now under way indicate the possibility of the development of a safe and equally effective spray. Bait traps are now useful only in detecting infestations—an important use—since the kerosene attractant used will attract only male flies. Continued studies may reveal an attractant to which females as well as males will respond. These developments reveal important leads and research along these and other lines is essential for the eradication program which has been so effective during the first 6 months of the campaign. A study of the canning industry, with special reference to the utilization of byproducts and its bearing on fruitfly control, would seem to be a very desirable addition to the research program.

"The eradication division involves many important features. From an infestation where hundreds of flies could be obtained with a few sweeps with a net and where invested fruit was common, to a point where all methods of trapping fail to catch a single fly and where no fruit infestation can be located in spite of diligent and extensive search, is little less than marvelous. Weather conditions may have assisted in reducing the infestation but a study of all the data clearly shows that the complete destruction of fruits in the infested zones and the thorough use of poison sprays have been largely responsible. That infestations have not been found in adjoining States where much fruit was shipped previous to the discovery of the infestation, nor in the known infested area, are facts difficult to explain. That infestations will be found, at least in the original infested zones, before the end of June 1930 seems almost certain. For this reason sufficient funds should be immediately available for stamping out incipient outbreaks, should they appear.

A continuation and enlargement of the inspection and scouting work is essential to discover any occurrences of the fly before they become conspicuous. Spraying should be continued in the vicinity of citrus groves where injury to the trees and shrubs is not likely to result. The complete destruction of "drops" and the inauguration of a host-free period (approximately April 1 to September 1) by removal of the citrus and other susceptible fruits, such as peach, pear, guava, and Surinam cherry, seems to be an important feature of the eradication program. Destruction of abandoned groves is likewise important in the proposed program of eradication.

"A very thorough study of wild native-host fruits in 600 square miles of wild, natural growths, exclusive of abandoned groves, has failed to reveal a single infested fruit. For this reason, and until such findings are made, we believe a general clean-up in such areas unnecessary. This will materially reduce the cost of an efficient eradication campaign.

"An important part of the project is the quarantine which involves the possible spread of the fly by means of public carriers. This work has been admirably accomplished by the National Guard of Florida. The utilization of the State National Guard for the enforcement of quarantines has never before been attempted and the methods and effectiveness of this organization for quarantine duty where a single State is involved are heartily endorsed. The enforcement of garbage disposal, screening of fruit stands and fruit-delivery wagons is important from the standpoint of eradication and should continue as a phase of the quarantine under the supervision and control of the State National Guard.

"Many who have objected to one or another phase of the fruitfly project were interviewed, but after discussion and conference a distinct majority were in favor of a continuation of the research and eradication work on a reasonable basis. It was apparent that the comparatively few who questioned the need or efficiency of the work usually did so because they were uninformed on the significance of the Mediterranean fruitfly should it become established and beyond control, and on the immensity of a program of eradication. For these reasons we believe better methods of fully informing the public should be used and that an efficient program of education be inaugurated.

"The appropriations already made for the eradication program have been so effectively used that infestation is not now apparent. The failure to continue the program of eradication as a measure of precaution might threaten the efficiency of the work already accomplished. In addition, an emergency fund as a reserve might well be provided and made available only in case of new outbreaks in outside areas which would constitute emergencies.

"The committee desires to express its appreciation for the active and willing cooperation on the part of the Federal, State, and county officials in the inauguration and prosecution of the eradication program."

Following the report made to the Secretary of Agriculture by the committee of seven in July 1929, there was a general revision of quarantine 68. The essential changes were as follows:

1. The substitution of an "Eradication area" for the former "Protective zones." This area was defined as any area in an infested State in which an intensive eradication program was being carried out and included areas hitherto designated and retained as infested and protective zones.

2. The semiweekly (later changed to weekly) pick-up and disposal of drops during the ripening and harvesting period by the property owners.

3. Application of a poison-bait spray in infested zones at Federal expense, and in other parts of the eradication area at the expense of the property owners as a condition of crop movement.

4. Elimination of the requirement providing for the destruction of all host fruits and vegetables in the infested, or mile, zone and substituting therefor provision for a partial destruction (depending upon intensity of infestation found) of host crops growing on infested properties only.

5. Provision for the shipment of sterilized host fruits from infested zones.

6. As a condition of interstate movement of restricted articles the State was required to enforce the elimination throughout the eradication area of all host plants, wild and cultivated, which normally produced fruits or vegetables susceptible to infestation during the host-free period.

PUBLICITY

Efforts to educate the growers as to the appearance and habits of the fly were only partially successful or were, not infrequently, misconstrued. A sincere effort which was made to prevent any statements being made by the press until

the pest was actually identified and the distribution roughly defined reacted against the officials in charge in the early days of the campaign. The finding of the fly in Florida grew within a few days from a news item of local interest to a point where the international news agencies were demanding a statement. It was not until representatives of several of these agencies delivered what was virtually an ultimatum to the effect that unless an official statement was made they would be forced to prepare their own copy for distribution that their demands for information were heeded. Official refusal to supply photographs of the infested groves was met with the statement that photographs taken by local photographers could be purchased at news stands and drug stores, and that, if necessary, sensational photographs could be made by the reporters themselves. In order to prevent uncensored, inaccurate, and garbled information and pictures from being broadcast over the country, carefully worded press articles and a few of the least offensive photographs were given to the Associated Press for release.

Interested citizens financed the printing of a colored poster showing the Mediterranean fruitfly in all of its stages and presented a large supply to the plant commissioner for distribution. Copies of this poster were supplied to county agents, district inspectors, postmasters, civic organizations, and individuals throughout the State.

Thousands of individuals could have easily become acquainted with the various stages of the fly by the distribution of vials containing larvae, pupae, and adults of the fly to every inspector on the force. The officials in charge were severely criticized for their failure to adopt this practice. However, if this material had been supplied to the field men, many people would have attempted to substantiate their unfounded charges that the fly was being "planted" by pointing out the fact that every inspector entering their property had larvae, pupae, or adults of the Mediterranean fruitfly in his possession, any one of which could very easily have been transferred into another vial and sent to Orlando as coming from that particular property. To safeguard the organization against such charges and yet to meet the actual necessities, carefully prepared specimens of the several stages of the fly were supplied to the district inspectors throughout the area.

The exhibit prepared by experts of the Department of Agriculture and set up at the various State fairs was assailed as adverse propaganda harmful to the State. Yet a large papier-mâché malaria mosquito with its attendant chart displaying the annual death rate in Florida from malaria on exhibit in the next booth aroused no protests from the public.

ORGANIZATION

The headquarters of all activities in Florida were in Orlando. The plant commissioner, in his dual capacity as agent of the Plant Quarantine and Control Administration and administrative officer of the State plant board was in charge of the work. For administrative purposes the various activities were separated into sections, under the direction of a section head. Each section head was responsible directly to the plant commissioner.

That the field work might be efficiently handled, the State was divided into districts under the direction of district inspectors who were directly responsible to the plant commissioner in his role as agent of the Plant Quarantine and Control Administration. The districts were subdivided by the district inspectors for the purpose of inspection and clean-up. Crews of from two to four men under the direction of a crew leader were assigned to these subdistricts, each crew leader being responsible to the district inspector.

The set-up put into effect during the last part of April 1929, continued to function efficiently and smoothly until the work was suspended in March 1930. With one exception there was no change in the organization: In January 1930, the Chief of the Plant Quarantine and Control Administration, Lee A. Strong, who succeeded Dr. Marlatt on December 1, 1929, felt that the supervision of the issuance of permits for the interstate shipment of host material should be under the direction of a man entirely disinterested in the marketing of Florida products. For this reason, W. A. McCubbin, former assistant director, bureau of plant industry, Pennsylvania Department of Agriculture, was sent to Orlando to take charge of the permit and packing-house sections, with instructions to operate these sections as a separate unit responsible only to the Washington office of the Administration. Dr. McCubbin retained as his first assistants the two men formerly in charge and the two sections continued to function smoothly.

Some criticism has been directed toward those in charge of the eradication work on account of the fact that the men placed in charge of the various sections

were, in the main, employees of the State Plant Board, Florida Agricultural Experiment Station or Florida Agricultural Extension Service. Instead of criticism, this action should have been the subject of commendation and congratulation. The State, in the circumstances, was very fortunate indeed in having available men of training, experience, and demonstrated ability who could and did step into positions of responsibility and "carry on" without the delays and mistakes which would inevitably have resulted from the employment of men who lacked these qualifications. That the selection of these men was a happy one for Florida is evidenced by the fact that these men are chiefly responsible for the almost miraculous outcome of the eradication campaign.

CONCENTRATION OF INSPECTORS

By May 1, 1929, all available inspectors of the board had been concentrated at Orlando for the purpose of making inspections for fruitfly. In addition, several employees of the Florida Experiment Station and the Florida Agricultural Extension Service had been drafted for this important work. These men were selected because of their previous training. Additional men were employed as rapidly as possible. Every effort was made to secure only high-class men, and their past records and recommendations were carefully considered before they were engaged.

On this same date, May 1, 1929, the various regulations contained in the Federal quarantine 68 went into effect and a tremendous responsibility was thrown on the shoulders of the men in charge of the work by the provision in the Federal quarantine requiring the certification of all hosts of the Mediterranean fruitfly as a condition of interstate shipment. At that time there were only 138 men on the force, and these men were badly needed for the purpose of delimiting the fly infestation.

That host fruits and vegetables might move interstate without delay, it was necessary to organize overnight a force of from 75 to 100 permit inspectors. This huge task was accomplished for the most part by authorizing the various county agricultural agents to act as permit agents. Thus the balance of the 1928-29 crop was moved at practically no additional cost for labor to the Federal Government. In addition to supplying the manpower necessary for the issuance of these permits, it was necessary to have millions of certificates printed on a few hours' notice. This was done by having a local printing shop run day and night for several days. To get the paper needed for these certificates the printing company purchased all available supplies south of Richmond, Va., and some were ordered from New York. The printing bill was defrayed out of Government funds on an emergency order from the fiscal agent; afterward additional permits were supplied by the Administration from Washington. In spite of these handicaps, certified host material was moving out of the State on the morning of May 1, 1929, with but very little delay—and this delay may be laid chiefly to the fact that the growers themselves were not familiar with the regulations of the quarantine.

LABOR AND EQUIPMENT

In addition to the great need for trained inspectors for field and permit activities, there was also a demand for laborers to collect and equipment to move the infested material to the pits in order that the properties, both infested and in the mile zone, might be quickly and efficiently cleaned of all host material. At first plans were made to rent local equipment; this soon proved to be a costly and inefficient system. The machines were for the most part old ones, and after a few days, or even hours, work, broke down and had to be repaired at Government expense. This condition was greatly relieved by the arrival at Orlando of three trainloads of machinery from the Department's depot at Toledo and by purchase of new machinery. A list of this equipment will be found below.

TABLE I. *Federal equipment and materials assigned to clean-up department in Florida*

EQUIPMENT FROM TOLEDO		EQUIPMENT PURCHASED	
Trucks:		Ford Model A roadster.....	1
International 1½-ton, stake body.....	4	Ford Model A 1½-ton stake body..	1
International 3-ton, stake body..	10	International 1½-ton stake body---	1
Chevrolet panel body.....	26	Federal 2-ton stake body.....	1
Ford light roadsters.....	13	Federal scout.....	1
Ford light panel body.....	5	International 1½-yard dump body..	25
Federal pumps.....	27	Dodge 2-yard dump body.....	25
Defiance 600-gallon tanks.....	37	Tractors:	
Defiance stake body, 3-ton....	10	International Farmall.....	2
Tractors:		International 10-20's.....	53
McCormick Deering 15-30....	18	Sprayers:	
John Deere.....	18	Bean Model T 28.....	28
Fordson.....	1	Friend Model APTBA 501....	16
Trailers:		Hardie Model M. M. 16.....	16
Fruehauf 1,000-gallon 4-wheel..	16		
Fruehauf 2-wheel.....	3		
Miscellaneous: Stubble shredders...	30		

TOTALS OF ALL VEHICLES USED BY ERADICATION SECTION

Trucks.....	187
Tractors.....	92
Sprayers.....	60
Trailers.....	19
Stubble shredders.....	30

The labor problem, however, was not so easily solved. Every effort was made to hire level-headed and dependable foremen to supervise the clean-up crews. In spite of this, however, several incompetent foremen were hired; these were discharged as soon as their unfitness for the job was discovered. The ordinary labor was composed of white men as far as possible, although in some localities it was necessary to hire colored labor on account of the scarcity of white men. The employment of both labor and foremen was greatly handicapped by the requests on the part of civic organizations and county authorities that only local labor be used. Thus it was oftentimes necessary to discharge able and trained men when the clean-up was completed in one district and to hire new and untrained men when this work was undertaken in another area. Many of the complaints of destruction of property and the disregard of the rights of property owners can be traced to this demand on the part of local interests.

This system of employing and discharging men which was forced upon the officials in charge resulted in a large number of names appearing on the pay rolls and caused many people to believe that an excessive number of men were being hired, with the resultant charges of extravagance. It is true that for 1 month there were around 6,300 names on the pay rolls. This is accounted for by the fact that entire crews were discharged when work was completed in one section and new crews hired when operations were started in a new locality. Thus a labor superintendent might have 400 names on his pay roll when, as a matter of fact and record, there were only 200 men actually employed in his crew at any one time.

A table showing the average number of laborers engaged on Mediterranean fruitfly work in Florida by months is given below. This table shows the average number of men on labor pay roll of the Administration for each month, including also a large number of trained and semitrained inspectors engaged in the more or less technical work of scout inspection and sterilization supervision but who had not been appointed as agents of the Administration upon a monthly salary basis.

TABLE II.—*Number of laborers engaged on Mediterranean fruitfly work in Florida by months*

	Ordinary labor	Quarantine lines	Research	Sterilization	Total
April 1929.....	416	—	—	—	416
May 1929.....	3, 160	460	30	—	3, 650
June 1929.....	3, 843	614	63	—	4, 520
July 1929.....	4, 596	593	73	—	5, 262
August 1929.....	5, 081	498	68	—	5, 647
September 1929.....	4, 733	507	70	—	5, 310
October 1929.....	2, 881	507	64	—	3, 452
November 1929.....	1, 162	510	61	74	1, 807
December 1929.....	955	565	43	84	1, 647
January 1930.....	905	642	48	61	1, 656
February 1930.....	718	642	50	70	1, 480
March 1930.....	709	625	50	68	1, 452
April 1930.....	100	—	47	28	175
May 1930.....	100	—	10	7	117
June 1930.....	444	324	10	5	783
July 1930.....	662	262	10	5	939
August 1930.....	446	49	8	5	508
September 1930.....	373	46	78	5	502
October 1930.....	106	9	5	3	123
November 1930 ¹	34	9	3	—	46

¹ After Nov. 15 there were only 18 men on the labor pay roll.

Table 3 shows the number of inspectors engaged in making field inspections for the fruitfly in Florida.

TABLE III.—*Number of men employed by the field inspection section by months from April, 1929, to December 31, 1930*

1929—April.....	138	1930—March.....	¹ 750
May.....	189	April.....	56
June.....	202	May.....	70
July.....	245	June.....	425
August.....	243	July.....	642
September.....	261	August.....	670
October.....	299	September.....	656
November.....	683	October.....	384
December.....	569	November.....	² 428
1930—January.....	695	December.....	216
February.....	735		

¹ 694 inspectors discharged March 26, 1930.

² This number reduced to 213 inspectors on November 16, 1930.

RESEARCH SECTION

In addition to the field work, the Administration established a research section at Orlando, under the direction of A. C. Baker, entomologist in charge of tropical and subtropical plant insect investigations, Bureau of Entomology, United States Department of Agriculture, who was responsible only to the Chief of the Administration. This section operated independently of but in close cooperation with the field organization engaged in the eradication, inspection, and certification work. It rendered very material assistance in the eradication campaign. It was through this section that information concerning the various hosts of the Mediterranean fruitfly was secured. Acknowledgment should be made here of the extensive herbarium of host-producing plants, together with many photographs of plants and fruits, donated to the Florida Agricultural Experiment Station by the research section through the kindness of Dr. Baker. Valuable data in connection with the life history of the Mediterranean fruitfly were secured. The bait-spray formulas used by the eradication forces were worked out by Dr. Baker and his assistants. Poison-bait sprays of one kind or another had been used in South Africa and elsewhere in the control of the Mediterranean fruitfly. It was felt that a similar practice in the Florida eradication campaign could be followed to advantage. The research section therefore concentrated on the development of a formula suitable for the purpose and recommended the formulas which were used by the field organization throughout the campaign. Perhaps the outstand-

ing achievement of the research section was the development of a method of sterilization of host fruits by heat which was the main factor in opening up the southern and western markets to Florida citrus fruits. This sterilization plan originated with Dr. Baker and was developed by him in cooperation with Dr. L. A. Hawkins of the Bureau of Plant Industry. These two experts worked out the details of the sterilization by cold which was used to some extent by the growers during the shipping season.

DEGREE AND EXTENT OF INFESTATION

The first infested property was found in the city of Orlando on April 8, 1929. The center of the infestation appeared to be a 40-acre grove owned by H. L. Hamlin and located at Marks and Mills Streets, about $1\frac{1}{2}$ miles northeast of the Government laboratory.

A hurried survey after the finding of the first infestation showed that almost every property in the city was infested. As the inspection progressed in the surrounding counties, it was discovered that the fly was established on the east coast, the west coast, and in the interior of the peninsula. The limits of the infested area were practically determined by the middle of July, and since August 1929, there has been no extension of the infested area. During the weeks between the discovery of the fly and the completion of the clean-up in the infested localities there was a very decided and alarming increase in the number of insects. Groves inspected one week without any signs of infestation being found were, a week later, discovered to contain numerous infested fruits. Groves reported by the inspectors to be slightly infested not infrequently showed, when the clean-up crews arrived a short time later, a heavy infestation which caused an excessive drop of the fruit. That this falling of fruit was not due to causes other than the fruitfly was conclusively established by the fact that there was an absence of such unusual drop in groves apparently not infested; in addition, from 50 to 85 percent of the fallen fruit in the infested groves was found, on examination, to contain living fruit fly larvae. Examination of 79 grapefruit from infested groves, by W. W. Yothers, entomologist, Bureau of Entomology, showed an average of 10.2 larvae per fruit. The remaining percentage of dropped fruit was frequently in such condition of decay as to make it impossible to say whether or not it had been infested. As a matter of fact, it was an excessive drop that first directed the attention of Mr. Hamlin to the infestation in his grove.

INFESTATION COUNT IN THE HAMLIN GROVE

To determine the degree of infestation in the Hamlin grove the following experiment was made: A piece of ground 4 feet wide and 25 feet long was marked off under the trees and 162 dropped citrus fruits were collected from this measured plot. An examination showed that 116 of these fruits were infested with the Mediterranean fruitfly while 46 showed no infestation. Of these 46 uninfested fruits, however, fully 50 percent were so badly decomposed that it was impossible to handle them. On the basis of this plot observation the infestation in this grove was 71.46 percent. In this same grove a square foot of soil was sifted in 10 different locations and an average of 13.9 Mediterranean fruitfly pupae per square foot was thus found.

While it is thought that the Hamlin grove was the center of the infestation, yet there is no way of demonstrating this as a fact. There were other heavily infested groves in that vicinity. Investigations carried on by three visiting entomologists¹ in the Gentile grove on Lake Adair, located about 1 mile west of the Hamlin grove, showed the following degree of infestation: Several citrus trees were selected at random, dusted with cyano-gas, and the number of adult Mediterranean fruitflies killed or stunned by the dust recorded. The number of flies collected varied from 80 to 300 per tree. A few days later this group again dusted these trees in the same manner. The tree that had furnished the greatest number of Mediterranean fruitflies on the first visit, approximately 300, furnished 612 adult Mediterranean fruitflies at the second dusting. The tree that had furnished the least number of flies on the first dusting, 80, yielded 350 Mediterranean fruitflies at the second dusting. The car used for transporting this party had been parked at the curb close to the grove next to the lake. Upon returning to it a number of live adult Mediterranean fruitflies were found inside the car. (At that time all men con-

¹ H. J. Quayle, professor of entomology, University of California, and a member of the committee of seven sent to Florida in July 1929; R. S. Woglum, entomologist, California Fruit Growers' Exchange, and William Moore, of the American Cyanamid Co.

nected with the work were supplied with small spray guns and an insecticide for spraying the interiors of automobiles.) In connection with the dusting carried on by Professor Quayle and his party it is interesting to record that of the adult Mediterranean fruitflies knocked out of the trees and collected at the first dusting approximately 70 percent were killed by the dust, and approximately 60 percent of the second lot were killed. The balance, needless to state, were killed in the laboratory after the count was made.

The Hamlin grove at Orlando was the first heavily infested grove found. The fact that there was ample time to make observations and records in this grove before clean-up activities commenced, together with the fact that many officials of both the State and Federal Governments and interested citizens visited this grove, coupled with the publicity given this property, lead many people to believe that this was the only heavily infested grove in the area. This, however, was not the case. As a matter of fact and record, there were many heavily infested groves in Orange, Osceola, and Volusia Counties. Several of these heavily infested groves were located on islands in rivers or lakes (Olivers Island in Osceola County and Drayton Island in Volusia County) far removed from the regular travel routes. These groves ranged from 5 to 150 acres in extent, and were well-cared-for properties returning considerable profit to the owners.

CITRUS NOT ONLY HOST INFESTED UNDER FIELD CONDITIONS

Although the citrus groves suffered almost entirely from the attacks of the Mediterranean fruitfly, citrus fruits were by no means the only fruits found infested in the field. Immature green pears (*Pyrus communis*) were found infested near Clermont, Lake County. In addition to larvae taken from the pears themselves 400 larvae were collected from peelings and pear scraps taken from a garbage can on the property. Eight of these larvae were sent to the laboratory where they were identified as Mediterranean fruitfly larvae. The other 392 larvae were transferred to apples in the experimental laboratory of the research section, and propagated for experimental purposes. About 75 percent developed and were identified as adult Mediterranean fruitflies. The method of handling was largely responsible for the failure of the remaining 25 percent to develop.

Surinam cherry (*Eugenia uniflora* Linn.) was another host found infested under field conditions. An infestation count was made in Orlando by inspectors of the research section with the following results:

On June 7, 1929, 500 larvae were collected from fruit taken from one Surinam cherry tree, and 750 pupae were sifted from soil under the same tree.

On June 11, 1929, 1,400 larvae were collected from fruit taken from one Surinam cherry tree, and 2,100 pupae were sifted from soil under this same tree.

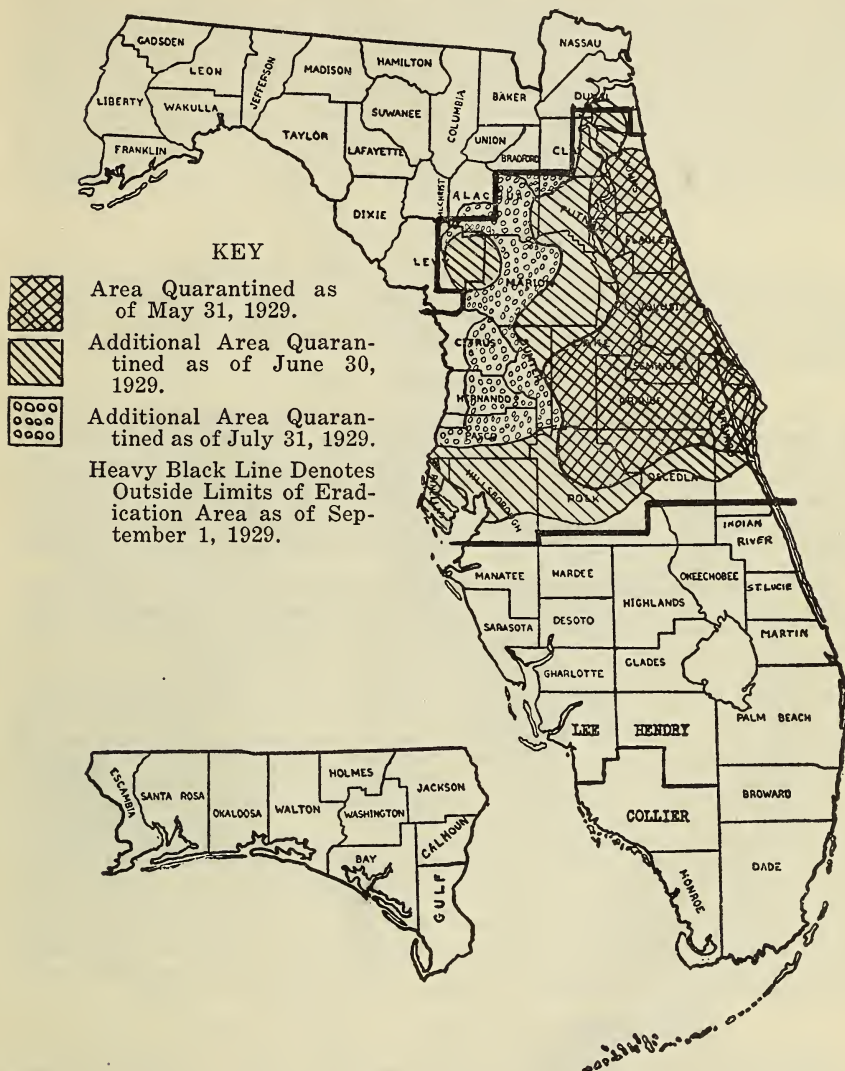
Peaches were also found infested in the field, both in Orlando and in the northern portion of the eradication area. Records show that on June 14, 1929, 550 pupae were sifted from the soil under a peach tree growing near the city limits of Orlando, Fla.

INFESTATIONS FOUND BY GROWERS

Every effort was made to locate the fly and to clean up the infested properties immediately. Speed was imperative if this pest was to be eradicated before it became widely and generally distributed. Unfortunately the very haste with which the eradication was carried on reacted against the work. Groves were cleaned of infested fruit so rapidly that the general public had no opportunity to see the fly. Many growers had never seen the fly in any of its stages and honestly believed that it was not present in the State, or at least not present in their own properties. It is known that several of these skeptical growers took what appeared to them to be sound commercial fruit into their homes for observation. Within a few days or weeks they were amazed to discover larvae in this "sound" fruit, or adult Mediterranean fruitflies in the jars in which the fruit had been placed. This experience was repeatedly related to inspectors by growers throughout the infested areas. There are on file in the plant commissioner's office in Gainesville affidavits from reliable and well-informed growers to the effect that apparently sound fruit hidden by them from the clean-up crews and stored in their houses for family consumption had become so heavily infested that it was later discarded as unfit for use. Other affidavits are on file to the effect that live Mediterranean fruitflies were reared from "sound" fruit placed in jars by growers.

CHART I

Map Showing Extension of Area in Florida Quarantined During Summer of 1929
on Account of Mediterranean Fruitfly



INFESTATION COUNT NOT MADE IN EVERY GROVE

Under the provisions of Federal quarantine 68 effective May 1, 1929, when an infestation was found all host fruits and vegetables within 1 mile of the infested property, as well as on the infested property itself, were to be destroyed, regardless of whether or not infestation was found on any other property in the mile zone. With this condition in mind, facing a situation that called for an immediate delimiting of the infested area and handicapped by a shortage of men, the inspectors in the early stages of the campaign were instructed to resume their search at least one-half mile away after finding fruitfly larvae in a property. After the limits of the infestation had been defined and with the employment of additional inspectors, however, every property was inspected. As a result of this effort to delimit the infested area as rapidly as possible, several groves adjoining infested properties were not inspected, and the inspectors left many other groves after finding a single infested fruit, although a further search would undoubtedly have disclosed many other infested fruits. After finding a single infested fruit, a tree-by-tree or fruit-by-fruit inspection would have been of no avail to the grower as the Federal Government had ruled that every host fruit not only on infested property, but on every property, infested or not, within 1 mile of an infested property, should be destroyed.

EXTENT OF INFESTATION

It was soon determined that the principal spread of the fly had been along the main traveled highways radiating from Orlando. The carriage of citrus fruits in private automobiles, by picnic parties, fishermen, hunters, tourists, etc., during the fruit season is almost a universal practice, under normal conditions, in the Florida citrus belt.

THE ERADICATION AREA

Up to December 31, 1930, a total of 1,002 infested properties distributed over 20 counties had been found by the official inspectors. There is of course no way of ascertaining how many other incipient infestations were snuffed out by the volunteer clean-up activities of growers and citizens. Under the rules and regulations supplemental to the revised quarantine No. 68—effective September 1, 1929, the area within which infestations were found was designated as the eradication area and embraced about 10,000,000 acres or between 15,000 and 16,000 square miles.

Within this area are located 72 percent of the bearing citrus trees of the State, producing normally 73 percent of the crop (6-year average). Citrus groves within this area total about 120,000 acres and cultivated noncitrus crops (fruits other than citrus and susceptible vegetables) total about 160,000 acres.

The balance of the area is given over, in part, to nonsusceptible crops, to towns and villages and to considerable areas represented by several thousand lakes. By far the greater portion of the remaining area consists of unimproved lands, including areas of swamp, hammock, cut-over pine lands, cypress forests, and marshes. Many of these, particularly where of considerable extent, were unquestionably effective barriers against the spread of the Mediterranean fruitfly.

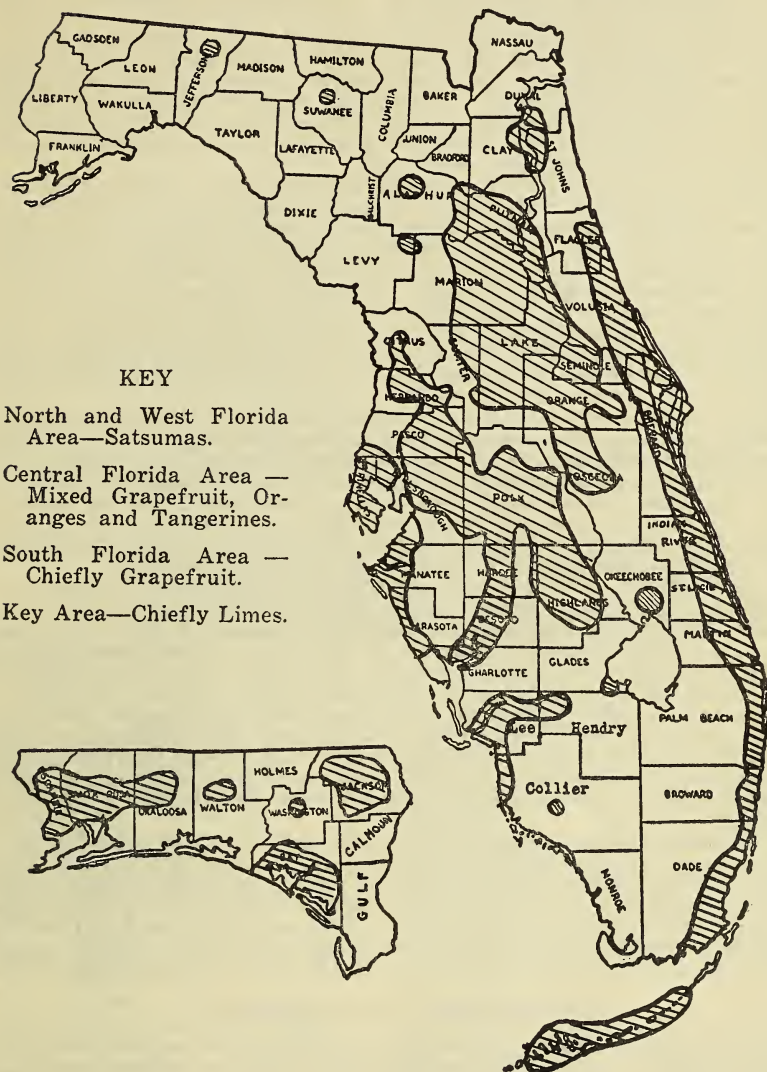
Citrus and vegetable plantings do not constitute a continuous area, as do the cultivated farms of many northern and western States, but instead are localized in communities or neighborhoods separated by intervening expanses of timber, swamp, lakes, or other areas so that the prevention of spread of the fly from one such cultivated area to another became essentially a matter of controlling the transportation of susceptible fruits and vegetables which might carry the fly in its immature stages, since the adult Mediterranean fruitfly is not a strong flyer and appears to spend its time in the locality where hatched. The occurrence of these many "natural barriers" to spread of the fly was undoubtedly an important contributing factor to success in the eradication attempt.

ORLANDO THE ORIGINAL PLACE OF ESTABLISHMENT

All indications point to Orlando or its immediate vicinity as being the point at which the fruitfly found original establishment. Not only is this view confirmed by the fact that here the most intensive infestations were found but that, as one proceeded in every direction from Orlando, infestations became more scattering and of much less intensity. In fact, nearly all infestations found at a considerable distance from Orlando were in their incipency.

CHART II.

Map showing General Location of Citrus Plantings in Florida.



NOT PREVIOUSLY PRESENT FOR A CONSIDERABLE PERIOD

There is no reason for believing that the Mediterranean fruitfly had been present for any considerable period before being discovered. This view is supported by a number of facts and observations, among which are the following:

Inspectors of the State plant board had been, since 1915, systematically and continuously inspecting the citrus groves of Florida for citrus canker and other major pests which might appear. These men had all been instructed as to the appearance of fruitfly larvae and were constantly on the lookout for them. This force of inspectors varied from 40 to 400. They found no indication of fruitfly and found no larvae living in sound fruit.

For many years, citrus growers were accustomed to collect and send numerous samples of citrus fruit to the State plant board and the agricultural experiment station at Gainesville and to the citrus experiment station at Lake Alfred, Fla., for examination and diagnosis of various minor troubles. Similarly, specimens of fruit were continuously being taken to the Department of Agriculture laboratory at Orlando for examination. Usually such specimens were cut up and carefully examined but no fruitfly larvae were found.

Florida has for many years been a veritable Mecca for hundreds of entomologists, both professional and amateur, who have made extensive collections of insects of all kinds, many of which specimens had been deposited with the United States National Museum, the Smithsonian Institution, the Bureau of Entomology of the Department of Agriculture, and in the museums and natural science departments of many colleges, universities, experiment stations, and other scientific institutions where they were examined, classified, and named. It is hardly conceivable, if the fruitfly has been present in Florida for any considerable period, that specimens would not have been collected and later detected among the many hundreds of collections of Florida insects in existence throughout the United States.

During the winter of 1928-29 the Orlando laboratory of the Bureau of Entomology conducted an extensive series of holding tests with citrus fruits, during the course of which large lots of fruit, including fruit produced at Orlando, were kept under observation at varying temperatures over considerable periods of time. Such fruit was examined every few days during the holding periods, much of it being cut up in the course of these examinations and, at the end of the experiment in April 1929, fruit which had been kept in storage for some weeks was given a most critical examination. Not a single fruitfly larva was found.

In April 1927, O. C. McBride, an experienced entomologist in the employ of the Bureau of Entomology, made an extensive survey of citrus properties in and around Orlando for the express purpose of seeing if any species of fruitfly were present. This survey included, among other things, an intensive examination of fruit in eight groves, with entirely negative results. These eight groves were, in April and May 1929, found infested by the Mediterranean fruitfly.

In September 1928, F. Silvestri, an eminent and widely known specialist on fruitflies, of Portici, Italy, visited Orlando in the course of a world-wide tour which he was making in the study of these insects. In company with local entomologists this expert on the Mediterranean fruitfly made an exhaustive search for fruitflies in the orchards in and around Orlando and found no indication of such being present.

A. C. Baker and his associates found, from studies made at Orlando, that the average number of eggs laid by the female fruitfly is 500, the minimum developmental period is 21 days and the average life cycle² under mean Florida temperature is 34 days (this including the pre-oviposition period) and, on the average, one-half of each generation are females. This capacity of the insect for rapid reproduction could account for its increase, within a few months after introduction, to the large numbers found in some of the Orlando groves in April and May of 1929.

HOST FRUITS AND VEGETABLES

Any fruit or vegetable in which the fly can deposit its eggs with the result that these eggs hatch and the resulting larvae grow to maturity is termed a "host" fruit or vegetable.

In the early days of the campaign and before the research section had an opportunity to determine just what fruits and vegetables were actually hosts under Florida conditions, the officials in charge of the eradication campaign, forced

² The "life cycle" of an insect is the amount of time required for the development of a generation, but bears no relation to the duration of life of the individual adult insect.

to close every loophole through which the fruitfly might possibly escape, turned to the records of other countries, where research work had shown certain materials to be hosts of the Mediterranean fruitfly, for a list of fruits and vegetables known to be hosts of this insect. In addition, the records of Government inspection officials listing material intercepted at ports of entry on account of being infested with this fly were also consulted. From these two official sources there was assembled a list of fruits and vegetables that were proven hosts of the Mediterranean fruitfly.

While this list was being prepared, C. B. Keck, junior entomologist, Bureau of Entomology, United States Department of Agriculture, under the direction of A. C. Baker, in charge of the research section of the Administration, at Orlando, started a series of cage experiments to determine the susceptibility of Florida-grown fruits and vegetables to fruitfly infestation. As rapidly as possible the results of these cage experiments were passed to the field men and corresponding changes or corrections made in the host list. As an illustration, cowpeas and string beans had been listed as hosts. Extensive cage experiments showed them to be nonsusceptible to infestation under Florida conditions and they were then removed from the list; cowpeas on June 27 and string beans on August 12, 1929.

This work of the research section has shown, under laboratory conditions (namely, in cages) 118 proven hosts, including in this list the various varieties of citrus fruits found susceptible to infestation.

With the exception of sour limes all varieties of citrus fruits commonly found in Florida have been found infested in the field. Other hosts which were found infested under growing conditions in the field included peaches, plums, pears, guavas, white-sapotes, Surinam-cherries, fruits of *Eugenia*, and the Barbados-cherry. It should be stated here that with one exception no field infestation of the Mediterranean fruitfly was found in any of the so-called "wild hosts," although inspectors of the research section made extensive surveys of this class of material during the summer and fall of 1929. An infestation was found in maypop (*Passiflora incarnata*) growing between an infested grove and the adjoining uncultivated land. This would indicate that the fly was discovered and eradication measures adopted and put into operation before it had an opportunity to leave the cultivated areas.

HOST LIST

Host Plants of *Ceratitidis capitata* Wied., as Determined by Cage Experiments at Orlando, Florida (to Dec. 1, 1930)

Prepared by C. B. Keck, junior entomologist, Bureau of Entomology, United States Department of Agriculture (contribution from Research Section)

W—Wild host

C—Cultivated host

*—Infested in the field

Scientific name	Common name	Date
W— <i>Acanthocereus pentagonus</i> (L.) Britt & Rose.	Cactus.....	11-18-29
W— <i>Annona glabra</i> Linn.....	Pond apple.....	9-23-29
C— <i>Annona muricata</i> Linn.....	Sour sop.....	8-10-29
C— <i>Annona squamosa</i> Linn.....	Sugar apple.....	8- 5-29
C— <i>Arenga saccharifera</i> Labill.....	Sugar palm.....	11- 4-29
C— <i>Artabotrys odoratissimus</i> R. Br.....	Climbing ylang-ylang.....	11-18-29
W— <i>Asimina obovata</i> (Willd.) Nash.....	Pawpaw.....	7-19-29
W— <i>Asimina parviflora</i> (Michx.) Dunal.	Pawpaw.....	7-29-29
W— <i>Asimina pygmaea</i> (Bartr.) A. Gray.	Pawpaw.....	7- 9-29
W— <i>Asimina reticulata</i> Shuttl.....	Pawpaw.....	9- 9-29
W— <i>Asimina triloba</i> (L.) Dunal.....	Pawpaw.....	9- 9-29
C— <i>Asparagus sprengeri</i> Regel.....	Sprengeri fern.....	11- 5-29
C— <i>Averrhoa Carambola</i> L.....	Carambola.....	9- 7-29
W— <i>Bumelia tenax</i> (L.) Willd.....	Buckthorn.....	10-13-29
C— <i>Bulia capitata</i> Beccari.....	Cocoa palm.....	8- 6-29
C— <i>Capsicum frutescens</i> var. <i>condoides</i> Irish.	Red pepper.....	6- 3-29
C— <i>Capsicum frutescens</i> var. <i>grossum</i> Sendt.	Bell pepper.....	8- 3-29

Host List—Continued

Scientific name	Common name	
W— <i>Carica papaya</i> L.....	Papaya.....	6-21-29
C— <i>Carissa carandas</i> L.....	Karanda.....	9-30-29
C— <i>Carissa grandiflora</i> DC.....	Natal plum.....	7- 8-29
*—C— <i>Casimiroa edulis</i> Llav. & Lex.	White sapote.....	5-25-29
C— <i>Chaenomeles sinensis</i> Koehne.....	Chinese quince.....	11-18-29
W— <i>Chrysobalanus icaco</i> L.....	Cocoa plum.....	8- 5-29
W— <i>Citharexylum fruticosum</i> L.....	Fiddlewood.....	9-30-29
W— <i>Citrullus vulgaris</i> Schrad.....	Citron (melon).....	10- 3-29
C— <i>Citrus aurantifolia</i> (Christmann) Swingle.	Mexican lime.....	9-10-29
*—C— <i>Citrus aurantium</i> L.....	Sour orange, Bitter-sweet orange, Myrtle-leaf orange.	4- 9-29
*—C— <i>Citrus maxima</i> Merrill.....	Shaddock.....	4- 9-29
C— <i>Citrus paradisi</i> Macf.....	Grapefruit (Pernambuco, Marsh, Foster, Duncan, McCarty, Royal)	4- 9-29
*—C— <i>Citrus limonia</i> Osbeck.....	Sweet lemon.....	4- 9-29
*—C— <i>Citrus mutis</i> Blanco.....	Calamondin.....	4- 9-29
*—C— <i>Citrus nobilis</i> Lour.....	King mandarin.....	4- 9-29
*—C— <i>Citrus nobilis</i> var. <i>deliciosa</i> Swingle.	Tangerine (Dancy, Cleopa- tra).	4- 9-29
C— <i>Citrus nobilis</i> var. <i>unshiu</i> Swingle.	Satsuma.....	11-10-29
*—C— <i>Citrus sinensis</i> Osbeck.....	Sweet orange (Homosassa, Valencia, Parson Brown, Malta, Lambs Summer, Lue Gim Gong).	4- 9-29
C— <i>Citrus</i> hybrids.....		
C— <i>Citrus aurantifolia</i> (Christmann) Swingle X <i>Fortunella japonica</i> Swingle.	Eustis limequat.....	9-10-29
C— <i>Fortunella margarita</i> Swingle X Citrange.	Citrangquat.....	11- 4-29
C— <i>Poncirus trifoliata</i> Raf. X <i>Citrus</i> <i>sinensis</i> Osbeck.	Citrange.....	11- 4-29
*—C— <i>Citrus nobilis</i> Lour. X <i>Citrus</i> <i>sinensis</i> Osbeck.	Tangor.....	4- 9-29
*—C— <i>Citrus nobilis</i> Lour. X <i>Citrus</i> <i>sinensis</i> Osbeck.	Temple.....	4- 9-29
—Parents unknown. Probably as above but may be a bud sport.		
C— <i>Citrus</i> U. S. D. A. hybrid No. 4493.	Citrus hybrid.....	11- 4-29
C— <i>Citrus</i> U. S. D. A. hybrid No. 4803.	Citrus hybrid.....	11- 2-29
C— <i>Citrus</i> U. S. D. A. hybrid No. 32255.	Citrus hybrid.....	11- 4-29
C— <i>Citrus</i> U. S. D. A. hybrid No. 48032.	Citrus hybrid.....	11- 4-29
W— <i>Coccolobis laurifolia</i> Jacq.....	<i>Coccolobis laurifolia</i>	11-29-29
W— <i>Coccolobis uvifera</i> (L.) Jacq.....	Sea grape.....	10-11-29
W— <i>Crataegus floridana</i> Sargent.....	Haw.....	9-17-29
W— <i>Crataegus galbana</i> Beadle.....	Haw.....	11-29-29
W— <i>Crataegus uniflora</i> Muench.....	Haw.....	10- 3-29
C— <i>Crinum asiaticum</i> var. <i>sinicum</i> Baker.	St. Johns lily.....	11- 2-29
W— <i>Cucumis anguria</i> Linn.....	Wild cucumber.....	11- 4-29
C— <i>Cucumis melo</i> var. <i>cantalupensis</i> Naudin.	Cantaloupe.....	7- 8-29
C— <i>Cucumis melo</i> var. <i>inodorus</i> Naudin.	Cassaba melon.....	6-24-29
C— <i>Cucumis sativis</i> Linn.....	Cucumber.....	10-16-29
C— <i>Cucurbita</i> sp.....	Squash.....	10- 5-29
C— <i>Cydonia oblonga</i> Mill.....	Quince.....	11-18-29
C— <i>Diospyros kaki</i> var. <i>costata</i> Andre.	Japan persimmon.....	10-28-29

Host List—Continued

Scientific name	Common name	
C— <i>Diospyros kaki</i> var. <i>fuyugaki</i> Linn. f.	Japan persimmon	8-12-29
C— <i>Diospyros kaki</i> var. <i>taber</i> No. 23 Linn. f.	Japan persimmon	10-28-29
C— <i>Diospyros kaki</i> var. <i>tane-nashii</i> Linn. f.	Japan persimmon	8-12-29
W— <i>Diospyros virginiana</i> Linn.	Wild persimmon	8-12-29
C— <i>Dovyalis hebecarpa</i> Warb.	Ceylon gooseberry	9-14-29
C— <i>Echinocereus polyacanthus</i> Engelm.	Cactus	9- 9-29
*—C— <i>Eugenia edulis</i> Vell.	Willow leaved eugenia	5-23-29
C— <i>Eugenia jambos</i> Linn.	Rose apple	6- 7-29
*—C— <i>Eugenia uniflora</i> Linn.	Surinam cherry	5-20-29
C— <i>Feijoa sellowiana</i> Berg.	Feijoa	11- 2-29
C— <i>Ficus carica</i> Linn.	Fig	7-22-29
C— <i>Ficus carica</i> var. <i>lemon</i>	Lemon fig	11- 2-29
C— <i>Flacourtia indica</i> Merr.	Governor's plum	7- 8-29
C— <i>Fortunella japonica</i> Swingle	Kumquat Miewa, Obi	4- 9-29
W— <i>Goebalanus oblongifolius</i> (Michx.) Small	Gopher apple	8-12-29
W— <i>Glycosmis pentaphylla</i> DC.	<i>Glycosmis pentaphylla</i>	11-18-29
C— <i>Hevea brasiliensis</i> Muell. Arg.	Brazil rubber	9-14-29
C— <i>Hylocereus undatus</i> Britt & Rose	Night blooming cereus	10-21-29
W— <i>Ilex caroliniana</i> (Walt.) Trelease	Carolina holly	11-29-29
W— <i>Lycium carolinianum</i> Walt.	Boxthorn	11- 2-29
C— <i>Lycopersicon esculentum</i> Mill.	Tomato	6-22-29
*—C— <i>Malpighia glabra</i> Linn.	Barbados cherry	5-23-29
C— <i>Mangifera indica</i> Linn.	Mango	6-10-29
W— <i>Melothria pendula</i> Linn.	Creeping cucumber	11- 4-29
C— <i>Monstera deliciosa</i> Liebm.	<i>Monstera deliciosa</i>	10- 4-29
C— <i>Musa sapientum</i> Linn.	Banana	10-16-29
W— <i>Nyssa biflora</i> Walt.	Black gum	10- 8-29
W— <i>Nyssa ogeche</i> Marsh.	Ogeeche lime	9-30-29
W— <i>Opuntia dillenii</i> (Ker.) Haw.	Prickly pear	9-30-29
C— <i>Opuntia engelmannii</i> Salm-Dyck	Prickly pear	6- 3-29
C— <i>Opuntia ficus-indica</i> Mill.	Indian fig	6- 3-29
W— <i>Osmanthus floridana</i> Chapm.	Wild olive	10-12-29
*—W— <i>Passiflora incarnata</i> Linn.	Maypop	5-28-29
W— <i>Passiflora suberosa</i> Linn.	Passion flower	10-17-29
C— <i>Persea americana</i> Mill.	Avocado	7- 1-29
C— <i>Pleiogynium solandri</i> Englm.	Burdekin plum	11- 2-29
C— <i>Poncirus trifoliata</i> Raf.	Trifoliate orange	9- 7-29
C— <i>Prunus domestica</i> Linn.	Plum	10- 3-29
*—C— <i>Prunus persica</i> (L.) Sieb. & Zucc.	Peach	5-21-29
W— <i>Prunus umbellata</i> Ell.	Wild plum	7- 8-29
*—C— <i>Psidium cattleianum</i> Sabine	Strawberry guava	6-24-29
*—C— <i>Psidium guajava</i> Linn.	Guava	5- 9-29
C— <i>Punica granatum</i> Linn.	Pomegranate	7-10-29
C— <i>Pyracantha coccinea</i> var. <i>lelandi</i> Dipp.	Firethorn	11- 4-29
*—C— <i>Pyrus communis</i> Linn. <i>serotina</i> Rehd.	Leeconte pear	7- 5-29
C— <i>Pyrus malus</i> Linn.	Apple	7- 1-29
W— <i>Scaveola plumieri</i> Vahl	Goodenia	7-27-29
C— <i>Sechium edule</i> Swartz	Chayote	11-26-29
C— <i>Selenicereus pteranthus</i> Britt. and Rose	Cactus	9-30-29
W— <i>Serenoa serrulata</i> (Michx.) Hook.	Saw palmetto	10- 8-29
W— <i>Smilax beyrichii</i> Kunth	<i>Smilax beyrichii</i>	11-26-29
W— <i>Solanum aculeatissimum</i> Jacq.	<i>Solanum aculeatissimum</i>	11-12-29
W— <i>Solanum carolinense</i> Linn.	Horse nettle	11-29-29

HOST LIST—Continued

Scientific name	Common name	
C— <i>Solanum nigrum</i> var. <i>guineense</i> Linn.....	Nightshade.....	6-24-29
C— <i>Solanum seaforthianum</i> Andr.....	<i>Solanum seaforthianum</i>	11- 5-29
W— <i>Solanum sisymbriifolium</i> Lam.....	<i>Solanum sisymbriifolium</i>	11- 2-29
W— <i>Solanum verbascifolium</i> Linn.....	Nightshade.....	11-29-29
C— <i>Thevetia nereifolia</i> Juss.....	Bestill nut.....	7-24-29
C— <i>Vitis</i> sp. hybrid.....	Beacon grape.....	6-15-29
W— <i>Ximenia americana</i> Linn.....	Hog plum.....	8-13-29

PROGRESS OF ERADICATION CAMPAIGN

Between the date (April 6, 1929) of the discovery of the Mediterranean fruitfly and the end of April 1929, 364 infested properties were found. With a steady increase taking place in the number of inspectors employed and with the gradual shaping of an organization, 378 more infestations were found during May. These findings did not indicate, necessarily, any great degree of spread by the fly during that period but were, for the most part, the finding of infestations which had become established prior to discovery of the fly or shortly afterward.

With progress in clean-up of dangerous material well under way and spraying work well started, the situation was, by May 31, being rapidly brought under control.

June revealed but 185 infestations. The number dropped in July to 64 and in August to 8. These figures include all infestations found, regardless of whether they were primary or secondary. One infestation was found in Orange County on November 16, 1929, and another in the same county on March 4, 1930. At St. Augustine pupae of the fruitfly were found under a sour orange tree in a city lot July 25, 1930. No infestations have since been found.

This record clearly indicates the definite and gratifying progress that was made in reducing the fly population and which finally resulted in the lifting of the quarantine on November 15, 1930.

TABLE IV.—Infestation by counties, showing date first infestation found and date last larvae, adults or pupae were found, Apr. 8, 1929, to Dec. 15, 1930

County	Total properties infested	Date first infestation found	Date last infestation found
Alachua.....	1	July 27, 1929	July 27, 1929 Larvae
Brevard.....	72	Apr. 25, 1929	June 26, 1929 Larvae
Citrus.....	1	Aug. 1, 1929	Aug. 5, 1929 Larvae
Duval.....	1	Apr. 29, 1929	Apr. 29, 1929 Adult
			July 1, 1929 Pupae
Flagler.....	6	June 22, 1929	Aug. 14, 1929 Larvae
Hernando.....	4	July 5, 1929	July 17, 1929 Larvae
Hillsboro.....	31	June 4, 1929	Aug. 13, 1929 Larvae
			June 15, 1929 Adults
Lake.....	96	Apr. 18, 1929	Aug. 2, 1929 Larvae
			July 23, 1929 Adults
Levy.....	7	June 29, 1929	July 15, 1929 Larvae
			July 27, 1929 Adults
Marion.....	12	May 21, 1929	Aug. 2, 1929 Larvae
			July 13, 1929 Adults
Orange.....	402	Apr. 8, 1929	Mar. 4, 1930 Larvae
			July 8, 1929 Adults
Osceola.....	29	Apr. 16, 1929	July 19, 1929 Larvae
			July 2, 1929 Adults
Pasco.....	9	June 26, 1929	Aug. 7, 1929 Larvae
			Aug. 7, 1929 Adults
Pinellas.....	16	May 30, 1929	July 20, 1929 Larvae
Polk.....	37	May 18, 1929	July 31, 1929 Larvae
Putnam.....	24	Apr. 29, 1929	Aug. 2, 1929 Larvae
			July 5, 1929 Adults
Seminole.....	97	Apr. 19, 1929	June 26, 1929 Larvae
			June 7, 1929 Adults
St. Johns.....	11	May 29, 1929	Aug. 27, 1929 Larvae
			July 25, 1930 Pupae
Sumter.....	1	May 24, 1929	May 24, 1929 Larvae
Volusia.....	145	Apr. 21, 1929	July 5, 1929 Larvae
			July 12, 1929 Adults
Total.....	1,002		

TABLE V.—*Mediterranean fruitfly infestations in Florida—summary, by counties and towns, showing locations of infested properties, Apr. 8, 1929, to Dec. 31, 1930*

	Total	Lake County—Continued.	Total
Alachua County: Melrose.....	1	Clermont.....	21
Brevard County:		Corley Island.....	1
Allenhurst.....	1	Eustis.....	20
Artesia.....	3	Fruitland Park.....	3
Aurantia.....	1	Grand Island.....	3
Banyan.....	2	Groveland.....	1
Canaveral.....	1	Lake Jem.....	1
City Point.....	1	Leesburg.....	1
Cocoa.....	11	Lisbon.....	1
Courtenay.....	2	Mascotte.....	1
Footman.....	2	Messina.....	2
Frontenac.....	1	Minneola.....	3
Georgiana.....	3	Montevista.....	1
Indianola.....	4	Mount Dora.....	8
Indian River City.....	1	Oakland.....	1
Lotus.....	1	Pittman.....	3
Merritt.....	1	Sorrento.....	7
Mims.....	8	South Clermont.....	1
Rockledge.....	8	Tavares.....	1
Sharpes.....	4	Umatilla.....	8
Shiloh.....	6	Withlacoochee.....	2
Titusville.....	9		
Turnbull.....	2	Total.....	96
Total.....	72	Levy County:	
Citrus County: Inverness.....	1	Montbrook.....	1
Duval County: Loretta.....	1	Raleigh.....	2
Flagler County:		Williston.....	4
Bunnell.....	1	Total.....	7
Espanola.....	2	Marion County:	
Ocean City.....	1	Belleview.....	2
Ormond.....	1	Eastlake.....	1
St. John's Park.....	1	Orange Springs.....	1
Total.....	6	Reddick.....	1
Hernando County: Brooksville.....	4	Silver Springs.....	1
Hillsborough County:		Stanton.....	2
Antioch.....	2	Summerfield.....	1
Branchton.....	1	Weirsdale.....	3
Brandon.....	1	Total.....	12
Goldstein.....	2	Orange County:	
Harney.....	1	Apopka.....	14
Knights Station.....	4	Bay Ridge.....	4
Lake Magdalene.....	1	Bithlo.....	1
Lutz.....	1	Clarcona.....	6
Plant City.....	2	Conway.....	20
Remlap.....	1	Edgewood.....	4
Seffner.....	2	Fairvilla.....	2
Sidney.....	2	Fort Christmas.....	13
Tampa.....	10	Fullers Crossing.....	3
Uceta.....	1	Golden Rod.....	8
Total.....	31	Gotha.....	9
Lake County:		Lake Jem.....	2
Albert.....	1	Lake Pickett.....	3
Altoona.....	1	Lakeville.....	1
Astatula.....	2	Lockhart.....	6
Astor.....	1	Killarney.....	1
Astor Park.....	1	McDonald.....	1
		Maitland.....	14
		Minorville.....	3

TABLE V.—*Mediterranean fruitfly infestations in Florida—summary, by counties and towns, showing locations of infested properties, Apr. 8, 1929, to Dec. 31, 1930—Continued*

Orange County—Continued.		Polk County—Continued.	
Mount Plymouth Corporation	2	Foxtown	2
Oakland	1	Galloway	1
Ocoee	19	Griffin	1
Orlando	149	Haines City	3
Orlo Vista	4	Lakeland	9
Piedmont	5	Loughman	1
Pine Castle	6	Medulla	1
Plymouth	5	Millard	2
Taft	4	Peace Valley	1
Tangerine	10	Polk City	2
Tildenville	5	Providence	1
Vineland	6	Socum	3
Wewahottee	1	Waverly	1
Windermere	13	Winter Haven	1
Winter Garden	8		
Winter Park	40	Total	37
Zante	4		
Zellwood	4		
Total	402		
Osceola County:		Putnam County:	
Campbell	1	Crescent City	2
Carolina	2	Drayton Island	1
Deer Park	2	East Palatka	1
Kissimmee	3	Fort Gates	3
Kissimmee Park	5	Georgetown	2
Narcoossee	4	Interlachen	2
Olivers Island	2	Keuka	1
Pleasant Hill	2	Lake Como	2
St. Cloud	5	Manville	1
Wolf Creek	3	Melrose	1
Total	29	Palatka	1
		Pomona	1
		San Mateo	4
		Welaka	2
		Total	24
Pasco County:		St. Johns County:	
Dade City	1	Armstrong	2
Jake Jovita	2	Bakersville	1
St. Joseph	3	Crescent Beach	1
Westley	1	Hastings	1
Zephyrhills	2	New Augustine	1
Total	9	Riverdale	1
		Spuds	1
		St. Augustine	2
		Switzerland	1
		Total	11
Pinellas County:		Seminole County:	
Bayview	1	Altamonte Springs	12
Clearwater	1	Chuluota	11
Dellwood	1	Forest City	6
Indian Rocks	2	Geneva	9
Ozona	3	Golden Rod	9
Palm Harbor	1	Lake Howell	2
Seminole	1	Lake Mary	3
St. Petersburg	6	Lake Monroe	1
Total	16	Longwood	14
		Maitland (vicinity)	3
		Markham	3
		Oviedo	9
Polk County:			
Auburndale	3		
Bartow	1		
Dundee	3		
Eagle Lake	1		

TABLE V.—*Mediterranean fruitfly infestations in Florida—summary, by counties and towns, showing locations of infested properties, Apr. 8, 1929, to Dec. 31, 1930—Continued*

Seminole County—Continued.		Total	Volusia County—Continued.		Total
Paola.....	5		Edgewater.....	1	
Sanford.....	10		Emporia.....	2	
			Garfield.....	2	
Total.....	97		Glencoe.....	2	
Sumter County: Oxford.....	1		Glenwood.....	8	
			Holly Hill.....	9	
Volusia County:			Lake Helen.....	3	
Alamania.....	3		New Smyrna.....	11	
Allendale.....	3		Oak Hill.....	9	
Ariel.....	6		Ormond.....	5	
Bakersburg.....	2		Orange City.....	3	
Barberville.....	4		Orange City Junction.....	1	
Benson Springs.....	4		Osteen.....	5	
Benson Junction.....	1		Pierson.....	2	
Beresford.....	5		Port Orange.....	12	
Bishopville.....	1		Seville.....	7	
Cassadaga.....	2		Shiloh (vicinity).....	1	
Cow Creek.....	2		Spring Garden.....	6	
Daytona.....	2				
DeLand.....	16		Total.....	145	
DeLeon Springs.....	5				

SPRAY PROGRAM

One of the procedures determined upon when the eradication campaign was undertaken was that of the use of poison bait spray. This procedure had a sound scientific background and was regarded as of prime importance in the program of eradication.

For the destruction of flies which had matured prior to removal of host fruits and vegetables a bait spray was applied to trees in infested properties and in properties within 1 mile thereof. This mixture as first applied consisted of the following formula:

Lead arsenate.....	pounds..	8
Crude brown sugar.....	do.....	50
Molasses.....	gallons..	10
Water.....	do.....	200

After the campaign was well under way, the amount of arsenate was reduced to 4 pounds.

Later it was determined by the research section that copper was toxic to the Mediterranean fruitfly and in the fall of 1929 copper carbonate was substituted for arsenic in the precautionary spraying. The formula used was:

Copper carbonate.....	pounds..	8
Sirup (blackstrap molasses).....	gallons..	5
Sugar (soft brown).....	pounds..	25
Water.....	gallons..	195

In carrying out the spraying program during the summer and fall of 1929 the following materials were used:

Sugar.....	pounds..	2, 218, 387
Lead arsenate.....	do.....	299, 309
Sirup (molasses).....	gallons..	375, 301

It was felt necessary that some steps should be taken for the destruction of adult flies for the reason that they may live for several months (maximum life recorded, 10 months).

The term "bait spray" is a misnomer, in that the material seemed not actually to attract flies for distances greater than a few inches and was not spread generally over the tree as is the case with sprays ordinarily used for control of insects. Only a small quantity was applied to each tree and that generally near the center of the top. Power sprayers were used, for the most part, in commercial groves and knapsack sprayers in small and residential properties. Official forces sprayed

as high as 110,000 acres a week within the infested zones. Growers themselves sprayed citrus groves quite generally in the remainder of the eradication area. Roadside spraying amounted to the equivalent of one spraying along 18,554 miles of highway. Roadside spraying was deemed advisable for a two-fold purpose: First, to create barriers of poison against the spread or flight of adult flies from infested properties and, secondly, to insure the death of flies developing from fruits discarded by travelers along the highways.

The bait was applied to wild and semiwild growth in the infested zones, the attempt, naturally, being made to effect the destruction of every adult fly that might be present.

During the late fall of 1929 many complaints were received by the plant commissioner to the effect that the poison spray used in the campaign was affecting the quality of the fruit and even damaging the trees themselves. To determine to what extent, if at all, this spray material was responsible for these conditions, a committee of outstanding Florida citrus growers, men with years of experience in citrus production and themselves having extensive investments in citrus groves, conducted an extensive survey. This committee, consisting of William L. Drew, chairman, Eagle Lake; Sam L. Harris, Eustis; A. R. Trafford, Cocoa; John S. Taylor, Largo; and Rupert Smith, Arcadia; made its investigation over the period from December 3, 1929, to January 21, 1930, serving without compensation and operating independently of the official forces engaged in the fruitfly work. Their summary of the situation and their conclusions, made public January 21, 1930, are quoted in full below:

"SUMMARY AND CONCLUSIONS OF THE CITRUS GROWERS' INVESTIGATIONAL COMMITTEE ON THE USE AND EFFECT OF ARSENICAL BAIT SPRAY AGAINST THE MEDITERRANEAN FRUITFLY

"1. The amount of injury caused by the 'bait spray' can easily be, and often has been, exaggerated. Many of the groves that have been sprayed 14 or more times show no injury to trees than can be detected and but little, if any, injury to fruit. This is generally true of trees 12 or more years old that were in a healthy and vigorous condition when the spraying began, and were not allowed to suffer from hunger. Where trees of this age have been allowed to suffer from hunger it is usually not possible to determine how much, if any, the 'bait spray' may have contributed to their impaired vigor.

"2. Injury has sometimes resulted in groves less than 12 years old ranging all the way from slight to severe. Here again the condition of the trees when sprayed is a very important factor. If healthy and well fed the harm resulting to trees of a particular size is likely to be much less than when the trees have been weakened by hunger or other causes. Vigorous well-grown trees from 8 to 12 years old usually show but slight evidence of injury. Younger trees are in much greater danger of harm from the spray and serious injury has often resulted. Where the trees have been weakened by hunger or other cause the injury has often been severe.

"3. Where injury has resulted it is manifested by the weakening and gradual death of the twigs and smaller branches which have been repeatedly struck by the spray. In the most severe cases the foliage on the living portions of the tree is sparse, the leaves are small, faded, and lifeless in appearance. New growth, if any, is weak and unthrifty.

"4. The injury has been much more severe, in groves where injury has occurred, where the spraying has been done by power sprayers than where knapsack sprayers were used.

"5. The damage is much more prevalent on trees grown on light, sandy lands than those on heavier sandy loams and hammock lands.

"6. The smaller the tree the more susceptible it is to injury from the spray.

"7. Pineapple orange trees seem more subject to injury than other varieties observed. Valencia orange trees are also injured. Dancy tangerines are resistant but not immune. Grapefruit trees, while not immune, are very resistant.

"8. No injury has been observed where the trees were sprayed only four times.

"9. Fruit has matured at least a month earlier than usual this year, and there has been an abnormally heavy drop. This has occurred in all parts of the State in sections where no spraying has been done, as well as where the 'bait spray' has been used.

"10. Injury to fruit is manifested by loss of acidity and consequent flatness of taste. It is greatest where trees have suffered most, and least where trees have suffered least. Some fruit has been burned by the spray; but this injury is not very common.

"In conclusion the committee wishes to make the following statement:

"The presence of the Mediterranean fruitfly in the State is a very serious menace to the citrus industry. Those who assert that it has been with us for a long time should prove their assertion. This committee does not believe it to be true. If the industry is to live the fly must either be eradicated or controlled. If control, rather than eradication, measures are adopted, all States that have reason to fear the fly will quarantine against all Florida products that are hosts of the fly. This, of course, if the Federal Government does not do it for them. These quarantines will continue until the fly has spread into all of these States and they have no longer any reasons to fear invasion from Florida. It is possible then that the time may come that unceasing and expensive control measures and the introduction of parasites may bring the fly under commercial control. This condition will not be reached for many years. Meanwhile, the industry will have perished for want of a market and will have to be started all over again when the readjustment is completed. This is not a pleasant prospect for the present generation of growers.

"The committee believes that the present favorable progress toward eradication is largely due to the use of the arsenic 'bait spray'. Nothing was known that could be substituted for it and there was no time to search for a substitute. Its use was therefore justified and wise. It was known that damage to trees and fruit might result from its use; but there was no reasonable alternative. This committee believes that the beneficial results of the 'bait spray' far outweigh the damage that has occurred. To blame the National Department of Agriculture and the State plant board for using the arsenic spray the committee believes to be unwise and unjust. While the 'bait spray' was being used, investigators have been searching for a substitute, and one has been found containing no arsenic which there is reason to believe will prove equally effective. The committee hopes that this may prove to be true and the use of arsenic can be discontinued.

"The committee has tried, in this report, to state the facts as it finds them, and at the same time not to lose sight of the peril that confronts the horticultural interests of the State."

The attention of growers and others who claim that the spray program carried on as part of the eradication campaign caused severe losses through the impairment of the flavor of the fruit and through damage to the trees themselves is called to the following three significant facts:

1. Very little, if any, bait spray was applied to that part of the citrus area lying outside of the eradication area. This area produces about one-fourth of the total crop. Therefore, of an estimated 1929-30 crop of 14,000,000 boxes, about 3,500,000 were produced entirely outside of the affected area; yet the complaints of poor quality fruit occurring last season were general.

2. The gross revenue to the State from the 1928-29 crop (26,266,965 boxes) was \$56,126,267. The gross revenue to the State from the 1929-30 crop (14,214,600 boxes) was \$52,757,313 or only \$3,378,954 less than the 1928-29 crop. The returns to the producer for the 1928-29 crop were \$5,038,711.65. The returns to the producer for the 1929-30 crop were \$16,942,604.³

3. The estimate of the State marketing bureau for the 1930-31 citrus crop is 26,500,000 boxes.

A careful study of the above figures should convince even the most bitter opponent of the spray campaign that the loss to the State through this activity was very, very small.

TRAPS

In connection with the investigations of the research section fly traps, baited with kerosene (which is attractive to the male flies) were widely used (a) in infested properties to maintain an approximate index on the prevalence of flies and (b) in "noninfested areas" to detect the possible presence of flies not discoverable by any other means. That these traps were of real value is demonstrated by the fact that as high as 81 adult flies were caught in 1 trap, and 373 in 29 traps in 1 day. These captures were made, of course, in the early days of the campaign when the adult flies were plentiful. Prior to August 1929, 1,644 adult Mediterranean fruitflies were caught in such traps, for the most part in properties known to be infested; but no adult flies have been captured by this or other means since that date, indicating, at least, a great scarcity of adult flies. On March 31, 1930, on which date the trap work was discontinued, there were 12,645 traps in operation.

³ The above figures were taken from the report of the Florida State marketing bureau.

ANALYSIS OF RESULTS

By the last of August 1929 an examination of the results following the application of the eradication measures also revealed encouraging information as to the efficiency of the measures used. In the case of 38 infestations, or foci, circumstances—such as the proximity of other infestations—made doubtful the value of any analysis but in the case of the remaining 962 the records, both of the infestations and succeeding developments, are sufficiently clear as to admit of significant interpretation. Nine hundred and fifty of these were quite evidently primary infestations; that is, they had become established prior to the application of eradication measures. In the case of these 950, no infestation was afterward discovered in such properties, or in the mile zone surrounding them, under conditions indicating “hang-over” or secondary infestations. Twelve infestations, out of 962, were quite clearly secondary; that is, they resulted from failure to make the eradication measures, at the first attempt, 100 percent effective. No tertiary infestations followed the clean-up and treatment of the 12 secondary or “hang-over” infestations. This indicates an efficiency of 98.8 percent in the eradication measures employed.

DEVELOPMENTS SINCE FALL OF 1929

In the fall of 1929 work against the Mediterranean fruitfly had to be slowed up as it was necessary to curtail expenses until Congress should provide additional appropriations. In the meantime, it was imperative that the Federal requirements with respect to crop movement be met and the crops kept moving out of the State.

On November 16 a light infestation was found some 10 or 12 miles west of Orlando, this being the first finding after August 1929. This was cleaned up and no further trouble occurred in that locality.

The matter of further appropriations had been presented to Congress by the Secretary of Agriculture and on December 18 Congress appropriated \$1,290,000. Of this, \$1,000,000 was to carry on the work of inspection and crop movement and \$290,000 was to replace moneys borrowed from other Department of Agriculture funds. In January it became apparent that further curtailments would be necessary to keep the crops moving under certification. Consequently on January 11, 1930, all eradication work (that is, spraying and clean-up) was discontinued.

FEDERAL FRUITFLY BOARD

To serve as the direct representatives of the Secretary of Agriculture, the Federal Fruitfly Board, consisting of five entomologists, commenced its duties in Orlando on January 21, 1930. This Board consisted of W. C. O’Kane, State entomologist, New Hampshire; P. J. Parrott, entomologist of the New York Experiment Station, New York; Geo. A. Dean, professor of entomology, Kansas State Agricultural College, Kansas; J. J. Davis, professor of entomology at Purdue University, Indiana; and W. P. Flint, State entomologist of Illinois. The functions of this Board as defined by the Secretary of Agriculture were “to consider all biological and entomological questions, to determine policies in the actual fruitfly eradication work, and to supervise and control Federal expenditures in the eradication effort;” and, further, “to provide for dissemination to all interested persons in Florida of full information on conditions in the fruitfly eradication work.”

The House of Representatives, on February 10, 1930, passed a resolution, introduced by Chairman Wood of the Appropriations Committee, authorizing an investigation as to the necessity for further appropriations for fruitfly work, as well as the general status of the fruitfly campaign. A subcommittee consisting of Representatives Will R. Wood, L. C. Cramton, R. G. Simmons, J. W. Byrnes, and J. P. Buchanan, held hearings at Orlando February 25 to March 8. On June 7, 1930, there was made available through congressional action \$1,740,000 for continuation of inspection and certification and \$1,500,000 for emergency eradication work.

On March 4, 1930, a slight infestation of the Mediterranean fruitfly was found in the environs of Orlando. This was thoroughly cleaned up and there has been no recurrence at that point.

By the middle of March or thereabouts it became apparent that a further curtailment of expenditures would be necessary if crop movement was to continue, and on March 26 instructions were received from the Secretary of Agriculture through the Plant Quarantine and Control Administration at Washington to suspend all inspection activities, effective that day. Arrangements were made,

however, to provide for the packing-house inspection necessary to keep the crop moving out of the State under permit. This incident, when considered with the discontinuance of the eradication work in January, suspended the entire program for a time. For this reason, on March 29 the plant commissioner resigned as Federal agent in charge and the work was taken over by the Federal Fruitfly Board, of which W. C. O'Kane was chairman. Later Mr. O'Kane became the Federal executive officer in charge of the work in Florida.

In connection with the discontinuance of the eradication work and the suspension of inspection work, the Department of Agriculture found itself in a position, because of lack of funds, where it could not keep the crops moving out of the State and maintain the quarantine lines around the eradication area at the same time. A request was therefore made by the Department of Agriculture that the State Plant Board of Florida take over, for a time at least, the maintenance of the internal quarantine lines. The alternative to this would have been the placing of all Florida within an eradication area. As a consequence, such advantages as the sections outside of the original eradication area enjoyed would be taken away. To consider this emergency the chairman of the State plant board called a special meeting of the board to be held at Tallahassee, March 30-31, and at the same time issued notice of a public hearing to be held on the same date. At this hearing the situation was gone over carefully with representative growers and shippers and the facts were later presented to the Governor and his cabinet. As the result of this discussion an agreement was reached whereby the State took over the maintenance of the quarantine lines on the morning of March 28. (The action of the Governor and his cabinet was retroactive to the 28th.) This State maintenance of the quarantine lines was continued until June 11-14, when it was again taken over by the Federal authorities.

DEVELOPMENTS SINCE JUNE 30, 1930

Congress in June made available for the Mediterranean fruitfly work in Florida the sum of \$1,740,000, and in addition there was appropriated an emergency fund of \$1,500,000 to be used when the President of the United States declared that infestations of sufficient number and intensity were found in Florida to justify its expenditure. Immediately upon this money becoming available the Administration on June 11 resumed the intensive inspection for the fruitfly in Florida. The field inspection force was rapidly augmented until there were employed during August some 670 inspectors in both the eradication and barrier areas. This force, with the usual changes in personnel, continued to function until October 15, 1930, when, again on account of a prospective shortage of funds, a considerable reduction was made in the field force, some 200 men being laid off. On November 15, when the Secretary of Agriculture lifted quarantine 68, another drastic cut was made in the number of men employed. With this reduction in the field force, there was a consolidation of districts throughout the State. The number of district inspectors was reduced from 25 to 12 and the field force was cut to 213 inspectors.

EXTENT OF INFESTATIONS SUMMER AND FALL OF 1930

From the date of the resumption of the field-inspection activities in June until the lifting of the quarantine on November 15, 1930, as has been previously indicated, only one infested property was located. On July 25 two pupae were found by Federal inspectors under a sour orange tree in St. Augustine. This finding was immediately investigated by the Secretary of Agriculture, who, together with the Chief of the Administration, Lee A. Strong, and various officials from the Orlando office of the Plant Quarantine and Control Administration, as well as representatives from the plant commissioner's office, visited the infested property on July 28. Immediately after the visit of the Secretary the usual steps were taken to clean up this outbreak.

COOPERATIVE SPRAY ACTIVITY

Inasmuch as there was now no money available for clean-up or spray measures (except in cases of emergency), the Administration was unable to carry on with the spray campaign during the summer of 1930. Realizing that this activity during the summer of 1929 was a very important factor in checking possible development and spread of the fly, plans were made for a resumption of spraying on a cooperative basis. Under the terms of this arrangement, the plant board agreed to supply the spray materials gratis to the growers; the Florida Citrus

Growers' Clearing House Association undertook to deliver the material to central supply depots throughout the peninsular part of the State; the Administration arranged to supervise the application of the spray, while the growers themselves agreed to do the actual spraying of all citrus trees both within the eradication area and outside thereof.

For a short time it appeared as if the board would not be able to carry its share of this arrangement. Participation in the spray program on the part of the board was made possible through the generous action of the Honorable Nathan Mayo, commissioner of agriculture, who arranged for the temporary transfer of \$10,000 from his department to the State plant board for the purchase of the necessary spray materials. Much credit is due Mr. Mayo and his department for his hearty cooperation with the board not only in this particular instance, but throughout the entire fruitfly campaign.

The difficult situation in which the board was placed with regard to participation in the spray program discussed in the preceding paragraphs was due to unusually large and unexpected obligations imposed upon it in connection with the maintenance of the internal quarantine lines at the boundaries of the eradication area. The board was forced to assume this unexpected obligation by reason of an adverse ruling of the Comptroller General of the United States, who, immediately following the congressional investigation in March, notified the Administration that the salaries of the men employed on road patrol activities for the month of March could not be paid out of Federal funds, this in spite of the fact that the employment of these men had been approved by the Washington office of the Administration and the Department had paid them regularly since May 1929. An opinion of the Solicitor of the Department that this expenditure should rightly and justly be assumed by the Department was overruled by the Comptroller General. This unexpected obligation, together with the road patrol salaries for April, May, and the first 2 weeks in June, placed the board in an embarrassing financial position. Although the legislature had appropriated \$500,000 for fruitfly eradication purposes, this money was only available at the rate of \$10,000 per month.

REMOVAL OF GUARDS ON ERADICATION AREA BOUNDARIES

From June 11 to July 30, the road patrol stations on the internal quarantine lines were maintained by the Administration. On July 31, pending formal action by the board, the chairman authorized the suspension of the board's rules prohibiting or restricting the movement of host fruits and vegetables from the eradication area to points outside thereof lying east of the Ocklockonee River. This action by the chairman was taken upon authorization by Secretary Hyde to modify the board's quarantine by removing from such classification all parts of Florida heretofore designated as eradication areas, and to declare all that part of Florida lying east of the Ocklockonee River a regulated area. With the authorization of such action on the part of the board there was no further need for the maintenance of the road patrol on the old eradication area boundaries in Florida, and on July 30, 1930, the Administration discontinued this activity.

IDENTIFICATION OF SPECIMENS

Perhaps the outstanding achievement of the Administration during the summer of 1930 was the collection and identification of many thousands of specimens collected by the field inspectors. As many as 8 to 10 thousand specimens a day were sent into the Orlando office and identified. Out of the hundreds of thousands of specimens collected, only one proved to be Mediterranean fruitfly (reference is made to the St. Augustine infestation found on July 25).

The failure to find Mediterranean fruitfly in any of its stages in these specimens greatly influenced the Administration in carrying forward its policy of gradually lightening the restrictions imposed by reason of quarantine 68. As a matter of fact, every revision of quarantine 68, with one exception, tended to lighten the burden imposed on the growers in Florida. This, we think, is a record for the Administration in connection with its many quarantines imposed throughout the country on account of the presence of major insect pests and plant diseases.

REVISIONS IN QUARANTINES

A general revision of quarantine 68, effective August 15, 1930, was announced by the Secretary of Agriculture on August 12. This revision was followed by a similar revision of the State quarantine. The most important changes in the

Federal quarantine were: (1) Removal of the regulation requiring sterilization of host fruits and vegetables shipped to the Middle Western States, except where the material was produced on properties close to points of recent infestation or where growers failed to comply with clean-up, spraying, and similar requirements; (2) opening of the South and West to shipments throughout the shipping season instead of being limited to the midwinter months; (3) restrictions on vegetable shipments modified so as to permit the shipment of unsterilized tomatoes, eggplants, and lima beans throughout the country, including the South and West. The requirement that peppers be sterilized when intended for shipment into the South and West was retained; (4) the "infested areas" were reduced in size from 1 mile to one-half mile.

Following this general revision in the Federal quarantine, the Administration made several other important changes during the following months. On October 15 the Secretary of Agriculture authorized the plant board to remove from the restrictions imposed by reason of quarantine 68 that part of the State of Florida between the Ocklockonee River and the Aucilla River, which action had the effect of increasing the number of counties comprising the west Florida area from 13 to 16 by the inclusion of the counties of Jefferson, Leon, and Wakulla.

As stated elsewhere in this report, W. C. O'Kane, chairman of the Federal Fruit Fly Board, was appointed Federal executive in charge of the eradication activities in Florida and continued to function in that capacity until October 15. Inasmuch as Mr. O'Kane's connection with the Administration was only a temporary one, it became necessary for him to return to New Hampshire on October 15, 1930, to resume his duties as entomologist of the agricultural experiment station of that State. P. A. Hoidale, senior plant quarantine inspector in charge of the Morelos fruitfly eradication project in Texas, was assigned by the Administration to assume the direction of the field activities in Florida. In his capacity as chairman of the Federal Fruit Fly Board and as Federal executive in charge of the work, Professor O'Kane, who came to Florida with no small reputation as an executive, made an exhaustive study of the fundamental points involved in the eradication campaign. After careful investigation Professor O'Kane continued the essential features of the original program when the inspection activities were resumed in June 1930. Thus through the administration of three different executives, and after investigation by two official commissions sent to Florida to inquire into conditions in the State pertaining to the eradication campaign, the policies and practices originally adopted were continued.

It is also worthy of note that in addition to the official investigations and approval of both the plan of campaign and the manner in which it was carried out, the eradication program was very favorably commented upon by members of the National Plant Board, who had opportunity during the annual meeting held at Orlando in January 1930, to make a careful study of the entire project. While the National Plant Board, whose membership is composed of agricultural and horticultural experts and specialists from all parts of the United States, has no official connection with the United States Department of Agriculture, its recommendations and decisions are given careful consideration by the Secretary of Agriculture and his associates.

On November 7, 1930, the State plant board, at its regular meeting held in Gainesville, discussed the advisability of lifting the present quarantine on Florida products. As a result of this discussion, the board requested the Secretary of Agriculture, Hon. Arthur M. Hyde, to take this action. On November 15, 1930, quarantine 68, imposed on Florida products because of the danger of disseminating the Mediterranean fruitfly, was raised by the United States Department of Agriculture.

In line with the action of Secretary Hyde in raising the interstate quarantine imposed on the movement of Florida products, the State plant board took similar action with respect to the intrastate quarantine. On November 10 the chairman, pending formal action by the State plant board, authorized the suspension, effective November 15, of rules 42D, 42E, 42F, 42G, 42H, 42I, 42J, 42K, 42L, 42M (2), 42N, 42O, 42P, 42Q, and 42R, which applied to the fruitfly activity. On December 6 the State plant board, at its regular meeting, formally authorized the suspension of the above-mentioned rules.

From the very beginning of the eradication campaign it was felt by both Federal and State authorities that the extermination of the Mediterranean fruitfly was not only essential to the welfare of Florida but to the welfare of the Nation at large. That others besides Federal and State officials felt that this activity was of national scope is evidenced by the action taken during the meeting of the

American Association for the Advancement of Science held at Cleveland in December 1930, when the American Association of Economic Entomologists there assembled adopted the following resolution:

"Whereas the establishment of the Mediterranean fruitfly in Florida constituted a great menace to the horticultural industries of the South and West; and

"Whereas the campaign to eradicate this pest has accomplished results far beyond our expectations; and

"Whereas this campaign is one of the outstanding achievements in the annals of economic entomology: Therefore be it

"Resolved, That the American Association of Economic Entomologists here assembled extends to the Plant Quarantine and Control Administration of the United States Department of Agriculture and to the State Plant Board of Florida its congratulations on the great work accomplished to date, and be it further

"Resolved, That a copy of this resolution be forwarded to the President of the United States, the Secretary of Agriculture, the Governor of Florida, and to the officials of organizations involved."

APPROPRIATIONS

April 15, 1929: The emergency fund of \$50,000 provided by a previous session of the Florida Legislature was made available through joint action of His Excellency, Doyle E. Carlton, Governor of Florida, and the State plant board. At the same time the board arranged for the transfer of other board funds for fruitfly purposes.

April 17, 1929: The sum of \$40,000 was made available by the Plant Quarantine and Control Administration for use in Florida, which sum was transferred from the pink-bollworm appropriation of the Administration.

May 2, 1929: \$4,250,000 was made available through joint action of the United States Senate and the House of Representatives by the transfer of this sum from an unexpended balance of the \$5,000,000 appropriated for the establishment and maintenance of noncotton zones in connection with the Administration's pink bollworm project in Texas.

June 7, 1929: The Florida Legislature appropriated the sum of \$500,000 for fruitfly-eradication work in Florida.

December 18, 1929: \$1,290,000 was made available by congressional action. Of this sum \$1,000,000 was to be used for inspectional work and crop movement and \$290,000 was to replace moneys borrowed from other Department of Agriculture funds.

June 7, 1930: \$1,740,000 was appropriated by Congress for inspection work only; at the same time an emergency fund of \$1,500,000 was provided for.

Financial statement Apr. 16, 1929, to Dec. 31, 1930, State and Federal Mediterranean fruitfly expenditures

Florida Plant Act of 1927-----	\$3, 970. 10	
State plant board, ch. No. 11808-----	35, 524. 53	
State plant board emergency appropriation, ch. No. 11808, sec. 2-----	50, 000. 00	
Mediterranean fruitfly, ch. No. 13693-----	284, 942. 83	
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	374, 437. 46	
Total credits (canceled warrants, etc.)-----	12, 681. 51	
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Total expenditures from State plant board funds to Dec. 31, 1930-----		\$361, 755. 95
Florida Agricultural Experiment Station-----	\$14, 077. 14	
Florida Agricultural Extension Service-----	5, 642. 86	
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		19, 720. 00
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Total from State funds to Dec. 31, 1930-----		381, 475. 95
Expended and obligated by Plant Quarantine and Control Administration on Mediterranean fruitfly work in Florida from Federal funds to Dec. 31, 1930-----		6, 471, 161. 00
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Total expenditures from State and Federal funds to Dec. 31, 1930-----		6, 858, 636. 95

QUARANTINES

On April 15, 1929, the State plant board adopted its first rules and regulations with the view of eradicating the fruitfly from the State. The board members kept in close touch with the situation throughout the campaign, and many special meetings, in addition to the regular monthly meetings, were held. As the situation developed the various rules and regulations in effect were amended to meet changed conditions, and new rules were adopted.

On April 26, 1929, the Secretary of Agriculture promulgated Federal quarantine No. 68 to cover the entire State of Florida, effective May 1. This quarantine prohibited the movement of all host fruits and vegetables and other possible carriers from infested areas, and provided for their movement from other areas under adequate safeguards. On May 16 administrative instructions were issued under this Federal quarantine to prohibit movement by any means of host fruits and vegetables from any part of Florida into the 18 Southern and Western States.

On September 1, 1929, quarantine 68 was revised, and during the months following further revisions were made so as to allow the interstate shipment of host fruits and vegetables, except infested material, or material produced on infested properties, from all parts of Florida.

Host fruits and host vegetables⁴ produced in the eradication area were allowed to move under permit into that part of the country north and east of the Potomac Yards, Va., and to points in Pennsylvania and New York and States north and east thereof. Sterilized host fruits and green tomatoes produced in the eradication area were allowed to move under permit into the Middle Western States. Peppers, lima and broad beans, produced in the eradication area were permitted to move into the Northeastern States only. Host fruits and vegetables produced outside the eradication area were allowed shipment under permit into all States except the 18 Southern and Western States. On November 21, 1929, the quarantine was further modified to permit movement of fruit under sterilization into the Southern and Western States (which sections up to that time had been excluded from all movement of host fruits and vegetables from Florida) until January 31, 1930.

RULES AND REGULATIONS RELATING TO THE HANDLING OF THE MEDITERRANEAN FRUITFLY ADOPTED, AMENDED, OR REPEALED BY THE STATE PLANT BOARD BETWEEN APRIL 15, 1929, AND DECEMBER 31, 1930

April 15, 1929

The following rules, pertaining to the Mediterranean fruitfly, were adopted: Rule 42-A. Declaring the Mediterranean fruitfly and articles infested therewith to be public nuisances.

Rule 42-B. Declaring Orange, Seminole, and a portion of Lake County, Fla., to be infested with the Mediterranean fruitfly.

Rule 42-C. Prohibiting the transportation within the State of Florida of material infested with the Mediterranean fruitfly.

Rule 42-D. Declaring fruits, vegetables, and other materials infested with the Mediterranean fruitfly subject to confiscation and destruction.

Rule 42-E. Prohibiting transportation of fruits out of area infested with Mediterranean fruitfly, except as provided.

Rule 42-F. Prohibiting transportation of vegetables out of area infested with Mediterranean fruitfly, except as provided.

Rule 42-G. Prohibiting movement of soil or earth and of trees and plants with soil about the roots out of area infested with Mediterranean fruitfly.

Rule 8-L (a new rule under the nursery series). Prohibiting the removal of nursery stock with soil about the roots from area declared infested with Mediterranean fruitfly.

Rule 42-H. Prohibiting movement of fruits, vegetables, and other agricultural products from places where Mediterranean fruitfly occurs, except as provided.

Rule 42-I. Providing that work in properties infested with Mediterranean fruitfly must be conducted under supervision of agents of the plant board.

Rule 42-J. Prohibiting planting, cultivation, and harvesting of crops in properties infested with Mediterranean fruitfly.

Rule 42-K. Prohibiting pasturing of livestock in properties infested with the Mediterranean fruitfly.

⁴ Tomatoes, peppers, eggplants, lima and broad or Fava beans.

Rule 42-L. Prohibiting removal of livestock, implements, vehicles, etc., from properties infested with Mediterranean fruitfly.

Rule 42-M. Packing houses, canneries, and cold-storage plants in area infested with Mediterranean fruitfly required to dispose of cull fruit and vegetables in accordance with plant-board requirements.

Rule 42-N. Garbage and plant refuse in area infested with Mediterranean fruitfly required to be disposed of in accordance with plant-board requirements.

April 27, 1929

Rule 42 (adopted). Defining words, names, and terms used in the fruitfly regulations.

Rule 42-B (amended). Extending area infested by Mediterranean fruitfly.

Rule 42-E (amended). Addition of words "or zones" after "areas" in line 4; and by insertion of words "or is likely to occur" after "occurs" in line 6.

Rule 42-F. Amended by addition of words "or zones" after "areas" in line 3; and by insertion of words "or is likely to occur" after "occurs" in line 4.

Rule 42-G. Amended by insertion of words "or zones" after "areas" in lines 3 and 5.

Rule 42-J. Amended by insertion of words "or in any infested zone surrounding such property" after "fruitfly" in line 3.

Rule 42-O (adopted). Requiring disinfection of freight cars, vehicles, equipment, and appliances which may act as carriers of fruitfly, when moved from infested areas.

Rule 42-P (adopted). Requiring screening of places of business, vehicles, etc., used in handling of host fruits and vegetables within infested area.

Rule 42-Q. Adopted. Declaring each property infested with Mediterranean fruitfly to be the center of an infested zone.

(1) Declaring area within 1 mile radius of infested property to be an infested zone and providing for inclusion of additional area therein.

(2) Requiring processing, etc., of hosts within infested zones; prohibiting planting of hosts within infested zone.

(3) Requiring treatment of soil in infested zone, railway cars, and vehicles, fruit-packing equipment, etc.

Rule 42-R. Adopted.

(1) Declaring area within 9 miles of boundary of infested zone a protective zone.

(2) Establishing a host-free period.

(3) Requiring destruction or processing of citrus fruits prior to commencement of host-free period.

(4) Prohibiting planting of host vegetables in protective zone which mature during the host-free period.

(5) Prohibiting existence of hosts in protective zone during host-free period, except immature citrus fruit; providing for storage.

(6) Prohibiting planting of host fruit trees within protective zone.

Rule 42-S (adopted). Prohibiting movement within State of citrus fruits in bulk; providing for movement to packing houses.

May 4, 1929

Rule 42 (e). Amended by insertion of words "which area is hereby declared to be an area in which infestation is likely to occur" in the second line.

Rule 42 (g). Amended by insertion of words "fresh or green" before "vegetables"; by addition of "cantaloupes and cucumbers" to definition of host vegetables; by insertion of "(including string beans, lima beans, and cowpeas)" after "beans of all kinds."

Rule 42-B. Amended to include additional infested area.

Rule 42-E. Amended by addition of the following to list of host fruits: Surinam cherries, grapes, kumquats, limes, loquats, persimmons, and blueberries.

Rule 42-F. Amended by substitution of "peppers of all kinds" for the word "peppers"; by addition of tomatoes and green or fresh beans to list; by insertion of "or" after "and" in third line.

Rule 42-J. Amended by addition of the following at end of rule: "Provided, That cover crops and green manure crops, the products of which are not subject to infestation, may be grown."

Rule 42-M. Amended by striking out the words "located in an area designated in the rules and public notices of the board as areas in which the Mediterranean fruitfly occurs"; by eliminating the words "of the board" at the end of the first

paragraph; by substitution of the words "in accordance with such safeguards" for the words "in such manner" in the second paragraph.

Rule 42-N. Amended by adding the word "or" after "and"; by addition of the words "and/or zones" after "areas" in the third line; by striking out the words "of the board" after "inspector" in the fifth line.

Rule 42-O. Amended by substituting "railway" for "freight" in the first line; by inserting "or through" after "from" in the fourth line; by adding "or" after "and" in the fourth line; by adding "and/or zones" in the fifth line; by adding "or is likely to occur" after "occurs" in the sixth line; by changing last line to read: "and otherwise handled in a manner approved by the inspector."

Rule 42-P. Amended by addition of "or" in the seventh line; by changing last clause to read: "and take such other precautions as the inspector may deem necessary to insure adequate protection from this pest."

Rule 42-S. Amended by addition of proviso for movement of citrus fruit in bulk from approved packing houses to approved processing plants when outside infested area; within protective zone; from packing house outside protective zone to processing plant within; and providing for closing, screening, or covering of vehicles in transit.

Rule 42-T. Adopted. Requiring destruction of stored host fruits and vegetables in infested and protective zones on June 1; providing for storage within such zones of fruits and vegetables produced outside.

May 13, 1929

Rul 42 (g). Amended by the addition of a number of hosts to list.

Rule 42-B. Amended to include additional infested area.

Rule 42-E. Amended to include additional host fruits.

Rule 42-F. Amended by changing the arrangement of the words.

Rule 42-G. Amended by addition of "sand, peat, compost, and manure" to list of materials given.

Rule 42-J. Amended by elimination of the following from third line: "or in any infested zone surrounding such property."

Rule 42-K. Amended by striking out the last clause and substituting the following: "except under such conditions and safeguards as may be deemed necessary by the inspector to prevent the dissemination of the Mediterranean fruitfly."

Rule 42-P. Amended by addition of words "having in their possession" in second line; by insertion of word "residence" in eleventh line.

Rule 42-Q (2). Amended by insertion of the following in the ninth line: "except as provided in rule 42-P and rule 42-T."

Rule 42-S. Amended by striking out the following from the second line: "for sale or delivery, or intended for sale or barter."

Rule 42-U. Adopted. Requiring removal and destruction of citrus fruits in infested and protective zones prior to June 15, 1929; providing for storage and interstate shipment.

(The following rules were adopted:)

Rule 43-A. Establishing a "barrier zone" or "zone 3."

Rule 43-B. Designating area west of Ocklockonee River as "zone 4."

Rule 43-C. (1) Prohibiting movement of citrus fruit from zone 3 to zone 4 except as provided.

(2) Prohibiting movement of citrus fruit in bulk or by truck from zone 3 to zone 4.

(3) Providing for movement of packed fruit from zone 3 to zone 4.

(4) Shipping season for fruit from zone 3 to zone 4 to close June 15, 1929.

(5) No permits to be issued for fruit produced in infested or protective zones to be moved to zone 4.

(6) Application for permits required.

(7) Requirements to be complied with by applicant for permits.

Rule 43-D. (1) Certain fruits and nuts exempt from restrictions in moving from zone 3 to zone 4.

(2) Providing for shipment of noncitrus fruits from zone 3 to zone 4.

(3) Bulk shipments of noncitrus fruits prohibited from zone 3 to zone 4 except as provided.

(4) Specifications for preparation of noncitrus fruits for movement from zone 3 to zone 4.

(5) Shipments of noncitrus fruit from zone 3 to zone 4 prohibited during host-free period.

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Rule 43-E. Shipment of certain green vegetables from zone 3 to zone 4 prohibited except as provided. Such shipments prohibited from infested and protective zones.

Rule 43-F. Soil, earth, etc., prohibited movement from zone 3 to zone 4.

Rule 43-G. Requiring thorough cleaning of railway cars, vehicles, and containers used in transporting hosts from zone 3 to zone 4.

Rule 43-H. Requirements to be met in moving fruit-packing equipment, etc., from zone 3 to zone 4.

Rule 43-I. Movement of nursery stock from zone 3 to zone 4—requirements to be complied with.

Rule 43-J. (1) Marking requirements.

(2) Inspection of containers and vehicles.

(3) Revocation of permits.

Rule 43-K. Form of permit.

May 28, 1929

Rule 42-B. Amended to include additional infested area.

Rule 43-K. Amended by striking out the words "Form 700 PQCA" and substituting "of the series Form 700 PQCA (namely, Form 700, 701, 702, etc. PQCA)".

Rule 42-E. Amended by addition of provision for movement of fruit from protective zones to Florida ports for export.

Rule 43-L. Adopted. Prohibiting movement of stone fruits from zone 4 into zone 3.

Rule 44. Adopted. Prohibiting shipment of stone fruits into Florida from other States.

June 8, 1929

Rule 42 (f). Amended by inserting the word "moss" in list of material, and adding to the rule the words "and all articles or things which in the judgment of the inspector may act as carriers of the Mediterranean fruitfly in any of its stages."

Rule 42-B. Amended by addition of infested area.

Rule 42-G. Amended by adding the words "moss (both fresh and processed or dried)" in lines 1 and 2, and by adding: "Provided, that this shall not apply to Fuller's earth, kaolin clay, phosphatic sand or clay and similar mined or dredged products, including sand, when, in the judgment of the inspector, such movement does not carry any risk of spreading the Mediterranean fruitfly."

Rule 42-Q. Amended by addition of paragraph 4—treatment of articles likely to carry Mediterranean fruitfly, when moved from an infested zone.

Rule 42-R (6). Amended by addition of proviso for planting of palms and of citrus trees in protective zone.

Rule 43-I. Amended by striking out the words "including all kinds of" and substituting "and all other."

Rule 45. Adopted. Requiring removal and destruction of host fruit trees and plants on abandoned or uncared-for properties.

June 17, 1929

Rule 42-B. Amended by inclusion of additional infested area.

Rule 42 (g). Amended by striking out of "(2)" the words "(including string beans, lima beans and cowpeas)" and substituting therefor the words "(except cowpeas)".

Rule 42-I. Amended by addition of the words "nursery, farm, garden, or other property" after the word "grove" in the fourth line.

Rule 42-J. Amended by inserting the words "farm, garden" after the word "nursery" in line 2; by striking out all that portion of the rule after the word "fly" in line 3, and substituting the following: "shall be carried on by the owner or his employees under the general supervision of agents of the State plant board designated for this purpose. Said agents shall prescribe such precautions in connection with the grove, nursery, farm or garden operations as will tend to prevent the spread or dissemination of the Mediterranean fruitfly: *Provided*, that no host fruits or host vegetables shall be planted within such infested grove, nursery, farm, garden or other property."

Rule 8-L. Amended by insertion of "or" after "and"; by striking out "is known to occur" and substituting therefor the words "occurs or is likely to occur".

July 15, 1929

Rule 42. Amended by addition of paragraph defining "quarantined areas" and changing lettering of subsequent definitions.

Rule 42-B. Amended to include additional infested area.

Rule 42-P. Amended by addition of following sentence: "All fruits and vegetables coming under the provisions of this rule and which have not been handled and safeguarded as required herein and any refuse or materials which might serve as an agency in the dissemination of the Mediterranean fruitfly are hereby declared to be public nuisances and as such are subject to immediate confiscation and destruction."

Rule 42-T. Amended to require: That cold-storage plants secure authorization for storing host fruits or vegetables; that the removal of host fruits and vegetables be under certain conditions; and to specify area to which stored hosts may be shipped.

July 26, 1929

Rule 43-L. Repealed. Prohibited shipment of stone fruits from zone 4 into zone 3.

Rule 44. Repealed. Prohibited shipment of stone fruits into the State of Florida.

August 12, 1929

Rule 42 (h). Amended by striking out the word "strawberry"; by striking out the words "beans of all kinds (including string beans, lima beans, and cowpeas)" and the word "cucumbers".

Rule 42-B. Amended to include additional infested area.

Rule 42-E. Amended by striking out the word "strawberries".

Rule 42-F. Amended by striking out the words "beans of all kinds (including string beans, lima beans, and cowpeas)"; by striking out the word "cucumbers".

September 16, 1929

(The following rules of the board with reference to the Mediterranean fruitfly were repealed:)

The 42 series (rules 42, 42-A, 42-B, etc.).

The 43 series (rules 43-A, etc.).

(The following new rules were adopted:)

Rule 42. Definitions of words, names, and terms used in the regulations.

Rule 42-A. Declares Mediterranean fruitfly as a public nuisance.

Rule 42-B. Declares certain areas as eradication areas.

Rule 42-C. Host-free period.

Rule 42-D. Spraying, clean-up, and planting limitations on commercial properties in eradication area.

Rule 42-E. Spraying and clean-up other than on commercial properties in eradication areas.

Rule 42-F. Eradication of infestation.

Rule 42-G. Fruit and vegetable sterilization.

Rule 42-H. Control of local handling and utilization agencies.

Rule 42-I. Storage-plant requirements.

Rule 42-J. Disposition of garbage and refuse.

Rule 42-K. Permits required.

Rule 42-L. Suspension of certificates and permits.

Rule 42-M. Marking requirements.

Rule 42-N. Prohibited shipments.

Rule 42-O. Special requirements as to containers and vehicles.

Rule 42-P. Restrictions on movement of cotton.

Rule 42-Q. Restrictions on the movement of sand, soil, earth, peat, moss, compost, and manure.

Rule 42-R. Nursery stock-shipping restrictions.

Rule 42-S. Restrictions on the movement of picking equipment and other articles.

Rule 42-T. Inspection in transit.

Rule 42-U. Shipment for scientific purposes.

Rule 42-V. State-wide citrus clean-up.

October 14, 1929

Rule 42-C (4). Revised to include loquats in exceptions.

Rule 42-D (2). Revised to include loquats in exceptions.

Rule 42-K (2). Revised by striking out: "or barrier area" and substituting "to any point in the State of Florida or from the barrier area to the west Florida area".

Rule 42-N (2). Revised by adding at end of paragraph the words "except under permit from the board."

Rule 42-N (3). Revised by striking out "when such movement is not to or through any point outside an eradication area"; by insertion of the following in the ninth line: "except that host fruits and vegetables may be moved for the *purpose of packing* from approved groves or fields to approved packing houses in field boxes with or without covering".

Rule 42-L. Repealed. Regarding removal of nursery stock with soil about the roots.

November 16, 1929

Rule 42-D (1) (a). Amended by substituting "weekly" for "semiweekly".

Rule 42-D (1) (b). Amended by substituting "weekly" for "semiweekly".

December 9, 1929

Rule 42-I. Amended in order to incorporate in the rule authority for certification of and suspension of not only storage plants but also processing plants and packing houses.

January 4, 1930

Rule 42-T. Amended by addition of the following sentence: "And all persons driving motor cars or other vehicles on the public highways must stop at plant board quarantine inspection posts for the purposes of inspection."

January 13, 1930

Rule 42-D (1) (a). Amended by adding in the second line, after the word "clean-up" the words "and approved disposition".

February 12, 1930

Rule 42-I. Amended by designating paragraph "2" as "2 (a)" and adding a new subparagraph "(b)," requirements for receipt of host fruits by cold-storage plants.

Rule 42-N (2). Amended by adding after the words "rule 42-O" the following: "nor by rail from one point within any eradication area to another point within that eradication area, except in standard commercial containers, or under permit."

Rule 42-N (3). Amended by inserting the words "cold storage" after the words "approved packing houses" in line 4; by inserting the words "cold storage and/or" after the words "from approved packing houses to approved" in line 5.

February 17, 1930

Rule 42-C (2). Amended by addition of subparagraph (b) permitting the production of cantaloupes in the eradication area until June 15.

Rule 42-C (3). Amended by the addition of the following words: "No date limitation is placed on the production of host vegetables outside the eradication area."

Rule 42-K (2). Amended by addition of the following proviso: "Provided, that this shall not apply to the movement of green tomatoes from the barrier area to points in the west Florida area when such movement is being made in accordance with all the provisions of the State and Federal regulations applying thereto."

Rule 42-P (cotton regulations). Amended by the addition of a new paragraph (1), changing the numbers of the others to 2, 3, and 4; by the addition of the following to paragraph (3): "provided, that the board may issue permits for the movement of seed cotton to points located in the barrier area for ginning only."

May 3, 1930

Rule 42-C (4) (Repealed). Regarding destruction of hosts which normally produce fruits or vegetables susceptible to infestation during the host-free period.

May 12, 1930

Rule 42-C (1). Amended by the addition of the words "except grapes" after the words "host fruits" in the third line; by changing the date of commencement of the host-free period for vegetables from June 15 to July 1 in the fourth line; by the addition of the words "and for grapes beginning on July 15" after the words "June 15" in the fourth line; and by changing the date of termination of the host-free period in the fourth line from October 1 to September 1.

Rule 42-C (1) (a). Amended by omitting the words "and Guatemalan" after the words "citrus fruits" in the first line; and by addition of the words "bananas and persimmons" after the word "avocados" in the same line.

Rule 42-C (2) (b). Amended to extend the period of production of cantaloupes in the eradication areas from June 15 to July 1.

Rule 42-D (2) (repealed). Regarding planting within eradication areas of certain hosts of Mediterranean fruitfly.

Rule 42-F (2). Amended by omitting the words "No host fruits or vegetables shall be planted within such infested grove, nursery, farm, garden, or other property, except under authorization from the board" after the word "fruitfly" in the tenth line.

June 16, 1930

Rule 42-A. Amended by addition of a third paragraph, designated as (3), providing for inspection of nurseries, orchards, etc., to determine whether Mediterranean fruitfly infestation exists.

July 14, 1930

Rule 42-H. Suspended that part of rule 42-H providing for the screening and otherwise covering of host materials of the Mediterranean fruitfly.

Rule 42-N (3). Suspended that part of rule 42-N (3) providing for the transportation of host fruits and vegetables in tightly closed railway cars or in screened trucks.

Rule 42-O (3). Suspended.

August 11, 1930

Rule 42 (series suspended). New series 42 adopted as follows: (This action necessary account revision Plant Quarantine and Control Administration, quarantine No. 68).

Rule 42. Definitions.

Rule 42-A. Declares Mediterranean fruitfly a public nuisance.

Rule 42-B. Declares certain areas as regulated and infested areas.

Rule 42-C. Eradication of infestation.

• Rule 42-D. Citrus-free period in regulated areas.

Rule 42-E. Spraying and clean-up in regulated areas.

Rule 42-F. Control of local handling and utilization agencies.

Rule 42-G. Packing, processing, and storage-plant requirements.

Rule 42-H. Disposition of garbage and refuse.

Rule 42-I. Fruit and vegetable sterilization.

Rule 42-J. Permits required and conditions governing the issuance of permits.

Rule 42-K. Suspension of certificates and permits.

Rule 42-L. Marking requirements.

Rule 42-M. Prohibited shipments.

Rule 42-N. Special requirements as to containers and vehicles.

Rule 42-O. Restrictions on the movement of sand, soil, earth, peat, compost and manure.

Rule 42-P. Nursery stock shipping restrictions.

Rule 42-Q. Restrictions on the movement of picking equipment and other articles.

Rule 42-R. Inspection in transit.

Rule 42-S. Shipment for scientific purposes.

October 14, 1930

Rule 42-G (3) (a). Amended by omitting the words "except to the west Florida area."

Rule 42-J (2). Amended by omitting the last sentence which reads as follows: "Except by special authorization of the board no permits shall be issued for the shipment of peppers nor for host fruits, unless the same has been sterilized by a

method approved by the Plant Quarantine and Control Administration, United States Department of Agriculture."

Rule 42-N (3). Amended by omitting the words "or from the regulated area to the west Florida area."

November 7, 1930

Rule 42 (e). Amended by substituting the words "Aucilla River" for the words "Ocklockonee River."

Rule 42-B (1). Amended by substituting the words "Aucilla River" for the words "Ocklockonee River" in the last sentence.

Rule 42-E (2). Amended by omitting the words "and vegetables" in the first and last lines.

Rule 42-G (2). Amended by omitting the words "or other host material" in line 2.

Rule 42-G (3) (a). Amended by omitting the words "and vegetables".

Rule 42-J (1). Amended by omitting the words "and vegetables" in line 1.

Rule 42-J (2). Amended by omitting the words "and vegetables" in line 2.

Rule 42-J (3). Repealed and new rule 42-J (3) adopted in its place. (This rule provides for shipment under permit of host vegetables from infested area and host fruits from infested and regulated areas.)

Rule 42-J (4). Repealed and new rule 42-J (4) adopted in its place. (This rule requires property inspection as a condition of movement of host material.)

Rule 42-J (6). Repealed and new rule 42-J (6) adopted in its place. (This rule provides for shipment of host material for export under permit.)

(The above action was authorized by Chairman Yonge on October 16, 1930.)

December 6, 1930

Rules 42-D, 42-E, 42-F, 42-G, 42-H, 42-I, 42-J, 42-K, 42-L, 42-M (2), 42-N, 42-O, 42-P, 42-Q, and 42-R suspended. This action necessary on account lifting of quarantine No. 68 by the Secretary of Agriculture, November 15, 1930.

(This suspension authorized by Chairman P. K. Yonge on November 13, 1930.)

CHANGES IN QUARANTINE NO. 68, PLANT QUARANTINE AND CONTROL ADMINISTRATION, UNITED STATES DEPARTMENT OF AGRICULTURE

Following the promulgation of quarantine 68 by the Federal Government on May 1, 1929, constant changes were made in the regulations by the Government, and, of course, by the board, following Federal action or approval. It is interesting to note that every such change lightened the load placed on the growers and shippers in the State. A list of the most important changes in the Federal regulations (followed in all cases by changes in State regulations except where interstate movement was concerned) is given below:

May 11, 1929: Green tomatoes, chile and cayenne peppers from infested zones permitted shipment to points north of Potomac Yards to June 30, 1929.

May 23, 1929: All noncitrus fruits and host vegetables from protective zones permitted shipment to points north of Potomac Yards to June 15; for grapes to June 30.

June 4, 1929: Citrus fruits from protective zones established subsequent to May 31 permitted shipment to June 15.

June 14, 1929: Eggplants and peppers of all kinds from protective zones permitted shipment to points north of Potomac Yards to June 30.

June 27, 1929: Cowpeas removed from host list.

July 2, 1929: Grapes produced in protective zones and stored in approved cold-storage plants prior to July 1 permitted shipment to points north of Potomac Yards throughout the year.

July 23, 1929: Limes produced in Dade and Monroe Counties permitted shipment to all States.

August 12, 1929: String beans removed from host list.

August 30, 1929: (1) Mature citrus fruits permitted to remain on trees prior to October 1.

(2) Shipments citrus fruits permitted prior to October 1, 1929.

September 16, 1929: Released from the eradication area the following territory:

(1) Southern tier of townships in Brevard and Osceola Counties.

(2) Two southern tiers of townships in Polk County.

(3) That part of Hillsboro County lying south and west of the Little Manatee River.

September 19, 1929: (1) Approved and authorized refrigeration method of sterilization.

(2) Authorized treatment in approved cold-storage plants in northern States. This opened up Midwestern States to eradication area fruit and permitted for first time shipment of fruit produced in infested areas.

October 11, 1929: Weekly clean-up of drops substituted for semiweekly clean-up.

October 12, 1929: Authorized State plant board to release as infested areas all areas so created prior to August 1, 1929.

October 23, 1929: Heat sterilization approved and authorized for grapefruit.

November 11, 1929: Sterilized citrus fruits from all parts of State except infested areas permitted shipment into southern and western States from November 21, 1929, to January 31, 1930. (Subject to extension of one additional month).

November 18, 1929: Tomatoes produced outside of eradication area permitted shipment to any State.

November 27, 1929: Heat sterilization approved and authorized for oranges, tangerines, and Satsumas.

November 30, 1929: On request of plant board authorized release from designation as infested areas all areas (eight in number) found infested subsequent to July 31 and up to and including August 27, 1929.

December 17, 1929: Celery permitted shipment without washing and under safe conditions specified.

December 26, 1929: Containers other than standard orange crates, etc., permitted.

January 23, 1930: Provided for movement of sterilized host fruits into and reshipment between Southern States, from November 21, 1929, to February 28, 1930.

February 3, 1930: Permitted sterilized fruit and tomatoes and eggplants from the infested State, as well as peppers and lima and broad beans produced outside the eradication area to move in unbroken original containers from Pittsburgh, Baltimore, and Washington to Virginia, West Virginia, and Ohio.

February 6, 1930: Extension of shipment period for cantaloupes to June 15 in eradication area.

February 11, 1930: Authorized certain fabric mesh bags as standard containers in accordance with PQCA-258.

February 19, 1930: Permitted cotton production in the eradication area in host-free period, and authorized movement of cotton intrastate for ginning.

February 20, 1930: Released west Florida from quarantine and gave it same status as 18 Southern States.

February 26, 1930: Extended shipping period of citrus and other host fruits to April 15, instead of April 1.

March 3, 1930: Permitted less than carlot express shipment of vegetables from the barrier area.

March 4, 1930: Authorized cold sterilization of 30° to 31° (15 days) for citrus fruits either in Florida or in North (not in Southern States).

April 1, 1930: Modified regulations covering production, harvesting, and shipping of host fruits and vegetables.

April 1, 1930: Explained spraying requirements for grapes.

April 10, 1930: Permitted reshipment of host fruits and vegetables sent carlot to Southern States, thus allowing regional distribution of these by small shipment. Reshipment to South from Northeast and Midwest not permitted.

April 14, 1930: Canceled the requirement for elimination of summer host plants but retained requirement of removal of susceptible fruits from these.

(Undated): Provided for disposition of citrus fruits, avocados, persimmons, and bananas, ripening during the summer host-free period.

April 30, 1930: Allowed peppers and broad and lima beans to move to central States; required for peppers spraying and a safety zone of 100 feet; provided for diversion of host vegetables (not host fruits) within the area of distribution.

June 21, 1930: Provided for host-free period beginning for—

(1) Citrus.....	April 15
(2) Other host fruits.....	April 15
(3) Cantaloupes.....	July 15
(4) Host vegetables.....	July 15
(5) Grapes.....	August 1

and continuing until September 1.

July 24, 1930: Provided for movement of sterilized avocados from Florida to other Southern and Western States.

July 24, 1930: Modification of production and harvesting period of Florida grapes. (See June 21, 1930.) Season for grapes beginning on August 16.

August 21, 1930: Sterilization of grapefruit, oranges, tangerines, satsumas, and avocados by use of heat.

August 21, 1930: Sterilization of grapefruit, oranges, tangerines, satsumas by refrigeration.

October 15, 1930: Revision of regulations 3 and 6, removing from quarantined area that part of State of Florida lying between Aucilla River and Ochlockonee River. Removes restrictions on shipment of host vegetables produced outside infested areas.

October 15, 1930: Amendment to regulations 6, 11 and 12:

1. Removing sterilization requirements for host fruits and vegetables moved interstate from those parts of Florida not included in infested areas.

2. Removing restrictions as to cleaning railway cars, boats, and other vehicles in moving restricted articles out of regulated area.

3. Providing for unrestricted reshipment from Northern to Southern and Western States of host fruits and vegetables originating in the regulated area. Therefore free redistribution allowed throughout United States of restricted articles moved from regulated area in compliance with regulations.

November 5, 1930: Removes prohibition against transportation host fruits from regulated area by trucks and other road vehicles under certain conditions.

November 15, 1930: Quarantines because of Mediterranean fruitfly lifted.

RELIEF AFFORDED BY REVISION OF NOTICE OF QUARANTINE NO. 68 EFFECTIVE SEPTEMBER 1, 1929, AS COMPARED WITH ORIGINAL QUARANTINE AND ADMINISTRATIVE INSTRUCTIONS SUPPLEMENTAL THERETO

1. Host fruits and vegetables reduced in number. Strawberries, gourds, pumpkins and squashes removed from host list.

2. Host-free period termination date advanced 1 month.

3. Permitted maturity host fruits and vegetables in zone 1 or infested zones.

4. Permitted shipment of sterilized host fruits and vegetables from infested zones.

5. Eradication measures in re new infestations. Destroy only limited portion in case of light infestation. If general infestation in a property only destroy host fruits and vegetables within property. Shipment under sterilization permitted of remaining fruits and vegetables.

SUMMARY SECTION REPORTS

FIELD INSPECTION SECTION

REPORT FROM APRIL 1929, TO DECEMBER 31, 1930

Citrus properties inspected.....	597, 843
Citrus trees inspected.....	235, 170, 709
Noncitrus properties inspected.....	215, 677
Noncitrus trees inspected.....	23, 115, 345
Vegetable properties inspected.....	23, 648

(NOTE.—The figures given above include reinspections, as the various properties were inspected several times.)

QUARANTINE ENFORCEMENT SECTION

REPORT FROM MAY 18, 1929, TO JULY 31, 1930⁵

It was the function of this section to inspect, at all railway, bus, and boat stations located within the eradication area, all baggage intended for transportation to points outside thereof, as well as all vehicles and baggage leaving the eradication area.

Vehicles inspected.....	4, 825, 989	Hosts found in vehicles.....	62, 089
Baggage inspected.....	5, 122, 219	Hosts found in baggage.....	20, 470
Total inspections.....	9, 948, 208	Total hosts found.....	82, 559

⁵ Guards on eradication area limits were removed July 31, 1930.

PERMIT SECTION

REPORT OF PERMIT SECTION FROM SEPTEMBER 1, 1929, TO NOVEMBER 15, 1930 ⁶

It was the function of this section to certify for interstate and intrastate transportation all material the movement of which was restricted by Federal or State quarantines.

Numbers of cars, host fruits and vegetables shipped interstate.....	49, 116. 49
Numbers of cars, host fruits and vegetables shipped intrastate.....	1, 096. 57
Total cars shipped.....	50, 113. 08
Numbers of truckloads citrus fruits moved to processing houses.....	20, 747
Numbers of single box express shipments.....	613, 112
Numbers of shipments nursery stock permitted movement.....	150, 790

TRANSIT INSPECTION REPORT

JANUARY 1, 1930, TO MARCH 31, 1930

In January 1930 inspectors were stationed at Jacksonville, High Springs, and other transfer points in the State for the purpose of ascertaining that all interstate movements of host fruits and vegetables were properly certified.

INTERCEPTIONS—EXPRESS AND BOAT SHIPMENTS

Returned to shipper:	Corrected and passed:	
Number of shipments.....	1, 125	Number of shipments..... 118
Number of crates.....	2, 316	Number of crates..... 704

INTERCEPTIONS—CAR LOTS

Returned to shipper.....	0
Corrected and passed.....	275
Total waybills checked.....	39, 868
Empty cars intercepted for cleaning.....	436
Empty cars inspected.....	26, 235

REPORT OF PACKING HOUSES, PROCESSING PLANTS, COLD STORAGE PLANTS, RAILROADS, AND SCREENING SECTION

FROM APRIL 15, 1929, TO NOVEMBER 15, 1930 ⁷

It was the function of this section to exercise supervision over packing, storage, and processing plants and related activities and to see that same were operated in a sanitary manner and in conformity with Federal and State requirements.

Total number of citrus-packing houses in State.....	342
Total capacity of citrus-packing houses in State (boxes).....	44, 942, 904
Total number of packing houses in eradication area.....	254
Total capacity of packing houses in eradication area (boxes).....	33, 378, 648
Total number of packing houses in barrier area.....	88
Total capacity of packing houses in barrier area (boxes).....	11, 564, 256
Total number of packing houses equipped for sterilization.....	66
Total number of sterilization rooms.....	178
Total number of vegetable packing houses in State.....	189
Total number of fern packing houses in State (certified and under inspection).....	22
Total number of cold-storage plants in State.....	146
Total capacity of cold-storage plants in State (boxes).....	811, 129
Total number of processing plants in State.....	70

(Above data as of 1929-30 shipping season.)

INSPECTIONS

Apr. 15, 1929, to Feb. 28, 1930, inclusive

Packing houses.....	79, 128
Cold-storage plants.....	839
Processing plants.....	3, 174
City dumps, cull pits.....	3, 375

⁶ Permit section discontinued on lifting of quarantine 68, Nov. 15, 1930.⁷ Packing house section was discontinued upon lifting of quarantine 68, on Nov. 15, 1930.

144 LOSSES SUSTAINED IN CAMPAIGN TO ERADICATE FRUITFLY

Apr. 15, 1929, to Feb. 28, 1930, inclusive—Continued

Railroads.....	738
Screening.....	68, 597
Confiscations.....	360
Permits issued.....	44, 749
Sterilization by heat: Number of cars.....	4, 454
Sterilization by cold: Number of cars.....	175
Number of canneries closed for minor violations.....	3
Number of packing houses closed for minor violations.....	17
Single box shippers permits revoked.....	9
Ferries inspected.....	1, 063

CLEAN-UP SECTION

Report for period from Apr. 13 to Dec. 31, 1929 ¹

Citrus clean-up:	
Total citrus acres.....	120, 157
Acres cleaned:	
1st time.....	120, 585
2d time.....	114, 775
3d time.....	87, 853
4th time.....	60, 170
5th time.....	19, 942
6th time.....	15, 411
7th time.....	5, 077
8th time.....	1, 535
9th time.....	411
10th time.....	732
11th time.....	407
12th time.....	2
Total acres cleaned.....	426, 900
Number properties cleaned.....	36, 207
Boxes citrus destroyed.....	489, 108
Cultivated noncitrus:	
Total cultivated noncitrus acreage.....	160, 775
Acres cleaned:	
1st time.....	127, 976
2d time.....	102, 825
3d time.....	90, 351
4th time.....	4, 056
5th time.....	209
Total acres cleaned.....	325, 417
Number properties cleaned.....	45, 003
Material destroyed:	
Vegetables (bushels).....	49, 974
Minor fruits (bushels).....	27, 395
Wild lands:	
Total wild-land acreage.....	803, 945
Acres cleaned:	
1st time.....	662, 225
2d time.....	251, 981
3d time.....	69, 088
4th time.....	2, 390
5th time.....	160
Total acres cleaned.....	985, 844
Number properties cleaned.....	40, 359
Totals (all):	
Acres cleaned and recleaned.....	1,738,161
Number properties cleaned.....	121, 569
Pits closed and open.....	2, 978

¹ The major portion of the work of the clean-up section was discontinued on Dec. 31, 1929.

STATUS OF SPRAY WORK AS OF DEC. 31, 1930 ⁸*Number acres sprayed to December 31*

	Zone 1	Zone 2	Total
1st time.....	186,954	136,918	323,872
2d time.....	145,118	116,391	261,509
3d time.....	140,548	106,171	246,719
4th time.....	137,720	114,949	252,669
5th time.....	129,918	11,804	141,722
6th time.....	132,731	10,539	143,270
7th time.....	142,005	4,483	146,488
8th time.....	137,332	1,410	138,742
9th time.....	133,428	1,800	135,228
10th time.....	129,302	4,466	133,768
11th time.....	105,821	2,709	108,530
12th time.....	87,841	1,473	89,314
13th time.....	72,921	1,800	74,721
14th time.....	70,438	2,363	72,801
15th time.....	46,112	444	46,556
16th time.....	29,558	1,344	30,902
17th time.....	10,428	-----	10,428
18th time.....	2,389	-----	2,389
19th time.....	596	-----	596
Total.....	1,841,160	519,064	2,360,224

⁸ The major portion of the work of the clean-up section was discontinued Dec. 31, 1929.

NOTE.—Roadside spraying to date 18,554 miles, 313,711 gallons mixture used. Wood spraying to date 140,315 gallons mixture used.

TRAP SURVEY DIVISION

(A contribution from the Research Section)

REPORT FROM MAY, 1929, TO MARCH 31, 1930 ⁹

It was the function of this division to provide for the determination of the distribution and population of adult Mediterranean fruitflies throughout both the eradication and barrier areas.

Chart No. 3, shown below, is a progress chart of the trap operations. The solid line shows the increase in the number of traps in operation, while the dotted line shows the increase or decrease in the number of adult Mediterranean fruitflies caught.

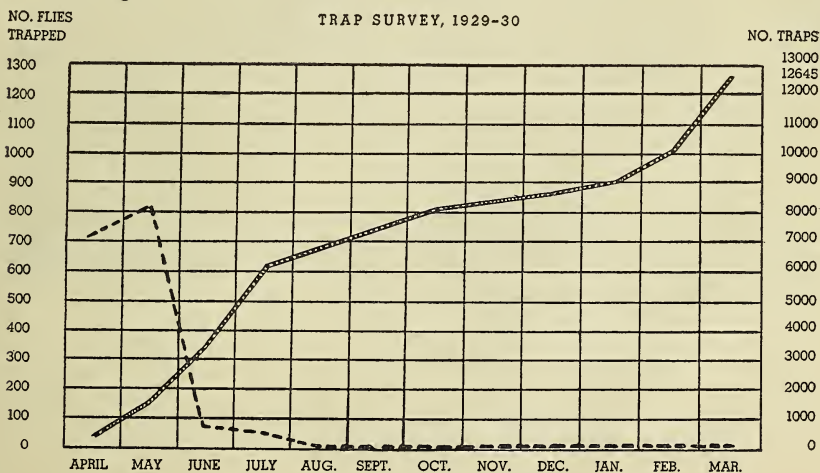


Table VI shows the distribution and number of the traps placed throughout the State, the number of adult flies caught, date placed in position and date the last fly was caught.

⁹ The trap survey was discontinued Mar. 31, 1930.

TABLE VI.—*Trap survey from May 1929 to Mar. 31, 1930*

County	Number traps used	When first placed	Number flies previously caught	Date last fly was caught
Alachua	385	July 1929	0	
Baker	25	October 1929	0	
Bradford	78	January 1930	0	
Brevard	1,028	June 1929	1	June 25, 1929
Broward	57	March 1930	0	
Charlotte	73	February 1930	0	
Citrus	268	August 1929	0	
Clay	112	February 1930	0	
Columbia	187	October 1929	0	
Dade	245	March 1930	0	
De Soto	188	January 1930	0	
Dixie	86	February 1930	0	
Duval	51	July 1929	0	
Flagler	210	November 1929	0	
Gilchrist	78	February 1930	0	
Glades	192	do	0	
Hardee	244	January 1930	0	
Hendry	94	February 1930	0	
Hernando	316	July 1929	0	
Highlands	40	February 1930	0	
Hillsborough	553	July 1929	0	
Indian River	204	October 1929	0	
Lafayette	78	February 1930	0	
Lake	724	May 1929	31	July 23, 1929
Lee	236	February 1930	0	
Levy	226	July 1929	11	July 27, 1929
Manatee	249	November 1929	0	
Marion	473	June 1929	12	July 13, 1929
Martin	164	February 1930	0	
Orange	1,275	May 1929	442	July 8, 1929
Orange—Hamlin grove ¹	44	do	1,112	May 28, 1929
Osceola	329	June 1929	1	July 2, 1929
Palm Beach	338	March 1930	0	
Pasco	237	July 1929	14	Aug. 7, 1929
Pinellas	402	do	0	
Polk	651	June 1929	0	
Putnam	438	do	1	June 24, 1929
Sarasota	80	February 1930	0	
St. Johns	343	July 1929	0	
St. Lucie	249	January 1930	0	
Seminole	301	May 1929	17	June 14, 1929
Sumter	176	June 1929	0	
Suwannee	64	October 1929	0	
Taylor	12	March 1930	0	
Union	55	November 1929	0	
Volusia	786	June 1929	2	June 28, 1929
Total	12,645		1,644	

¹ The Hamlin grove, located at Orlando, was the second infested property found in April 1929.

EXHIBIT F

This exhibit is an official publication of the United States Department of Agriculture. Citation to this generally available document which is not here reprinted is: Agricultural Statistics 1936, United States Department of Agriculture, 1936, pages 1-421.

The part of the publication cited as an exhibit is page 131.



